ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLV MAY, 1922 NO. 5

Architecture as a Human Document—Ancient and Mediæval Styles

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From a lecture delivered at the Metropolitan Museum of Art, New York

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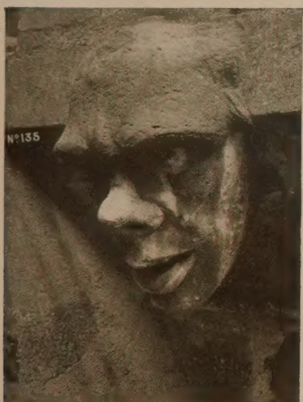

Grotesque, Rheims.

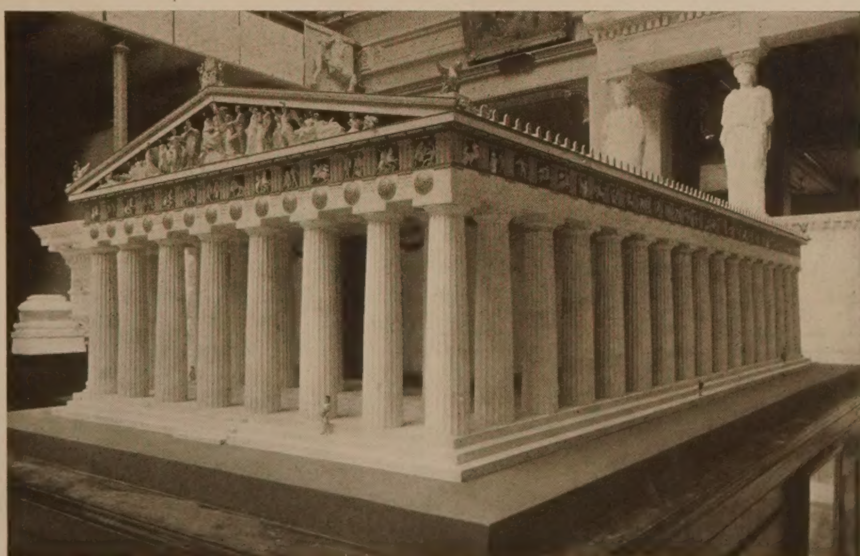
ARCHITECTURE has been called the history of man wrought in stone, and by a recent writer, not a professional architect, "the most convincing and eloquent expression of the life of its own age that the past has handed down to us."

The moral and religious significance of architecture was at one time, if not overrated, at least so emphasized, by writers who approached it from the literary point of view, as to obscure the merits or defects of a composition as a work of art. By a natural reaction, recent critics have been inclined to treat architecture almost wholly from the technical point of view, ignoring too much the great human background—the ideas and conditions that must have preceded and were largely responsible in determining the characteristics of the historic styles. This has been unfortunate for both architect and layman; for architects have failed to grasp the complete significance of the great works, and laymen, discouraged by the excessive use of technical terminology and narrowness of vision, too frequently have decided that it is a hopeless task to attempt to understand architecture at all.

My chief purpose in these articles is to try to suggest how the study of architecture may well supplement the study of social and political history. Indeed it would be possible to show how occasionally a knowledge of architecture has disclosed important facts and even prevented certain theories from leading us far astray in our search for historical truth. The late March Phillipps said: "What the historians give us of the past is usually truth with very little life in it, and what the romancers give us is usually the life with very little truth in it; but art's testimony is both living and true."

The historian of architecture usually deals chiefly with the æsthetic merits of the successive styles; and this is quite proper, as a sympathetic attitude is necessary for the adequate interpretation of the masterpieces of art. However, from our present point of view, the deficiencies and failures are of vast, if not equal, importance as revealing the characteristics and qualities of their producers.

Approaching the architecture of ancient Egypt, one sees reflected some of the aspects of nature and many of the characteristics of the people in their massive structures. It has been suggested, and probably with much truth, that the regular rise and ebb of the Nile influenced profoundly the people who dwelt upon its banks. While we know that Egyptian history and Egyptian life were more varied than


Model of the Parthenon, Metropolitan Museum, New York City.

Coucy.

was at one time believed, nevertheless the chief characteristics of the people remained the same for centuries, and this changeless aspect, this monotonous, unvarying, massive treatment of their architectural works, with the main stress laid upon horizontal lines, but confirms our knowledge of the Egyptians gained from other sources. Indeed, with few exceptions—a notable one of which is the temple of Queen Hatshepsu at Deir-el-Bahari—the architecture, like the people, seems eternally archaic, incapable of development into an intellectual art, and remains essentially materialistic to the end.

In the art of the Tigris-Euphrates valley, as in Egypt, one sees the persistence of the primitive, the childish, the archaic. In both countries the conditions of life were based upon an unusual and perennial fertility of the soil, due to the regular overflow and control of great rivers, and in both the unvarying routine that distinguished their civilization and mode of life is reflected in their art.

In Mesopotamian architecture the monotonous treatment of the masses with their regular sky-line is hardly relieved by the stepped pyramid or *ziggurat*, isolated or forming part of a group, as in the early temple at Asshur and the Palace of Sargon at Khorsabad. The ponderous forms were due largely to the materials available—the local mud or clay held in place and protected by an outer casing of burned bricks or a poor quality of stone. Still, there is much the same uncouthness, apparently due to definite choice, as in the architecture of Egypt.

Physical power was represented in the great winged bulls that served as portal guardians, and physical force, vigor of action, and ruthless cruelty have never been so vividly depicted as upon the wainscot slabs of the royal Assyrian palaces.

In approaching the master work of Greek architecture, the Doric temple, one discerns immediately the leading attributes of the Greek mind, which are clearness, logic, definition. Some one has said: "All there is eternally logical in the post and lintel principle of construction the Doric temple utters once for all with supreme felicity."

Technical critics have been prone to censure the Greeks for certain apparent inconsistencies in their buildings, when viewed from the standpoint of construction beautified. These critics usually have failed to appreciate that Greek logic was dealing with æsthetic principles rather than with the literal translation of forms developed in one material into those of another.

While the wooden origin of the Doric order is by no means universally accepted by present-day archæologists, and the attempt to explain all its parts by reference to a supposed evolution from clay and wood construction leads to material difficulties, the theory that the column was developed directly from the stone pier and that the triglyphs are little piers, rather than beam-ends, is not unattended with difficulties almost equally great. It was, indeed, æsthetic logic rather than structural logic that concerned the Greek designer primarily.

The Greek conception of the function of art was that it should be a source of ideas more than a record of them. In the Doric temple certain essential elements, such as unity, harmony, proportion, subordination, apply equally well to ethics as to art, and when carried to the point of perfection before our eyes reveal to our minds and hearts their intellectual and ethical significance. It has been said that arguments addressed to the mind are strong, but a spectacle addressed to the eye is stronger. Even if it be denied that it is stronger, it is at least an independent testimony. Thus we see that, while we are rarely inclined to give heed to the ethical or spiritual significance of Greek architecture, though perhaps not a primary consideration in the development of the style, it was of considerable importance.

But in spite of its perfection, perhaps because of it, Greek architecture does not fully satisfy modern taste. As Matthew Arnold says: "Though in many respects the ancients are far above us, yet there is something that we demand which they cannot give." Is it then surprising that

Ravenna. San Apollinare in Classe.

Cordova.

all modern attempts to revive and most of those to adapt the Greek style to present conditions have resulted and must result in failure?

Roman architecture is much more flexible and practical than the Greek, and is thus more nearly adaptable to modern requirements. Still, while the bigness, the grandeur, and dignity easily arouse our admiration, there is a uniformity, even monotony, to which modern culture will not submit.

Rome strove to unify all her possessions. She conquered nations and incorporated them in the empire, and at the same time connected them by bridges and roads, thus abolishing barriers and bringing distant provinces into connection.

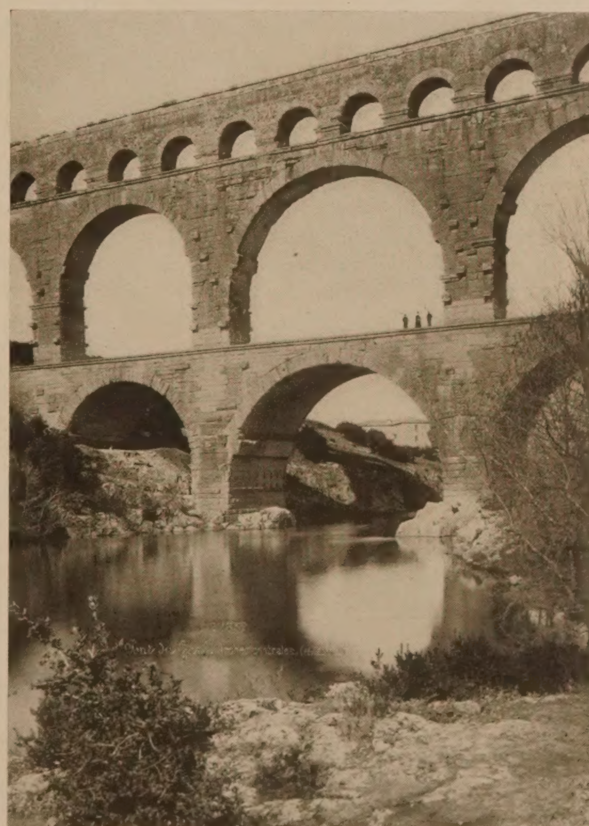
Her great aqueducts, that stretch across the plains with monotonous succession of arches, her amphitheatres, with their endless repetition of column and arch, and their unbroken rings of seats, are fit emblems of her irresistible course, her levelling, all-dominating policy, before which all limitations, all local varieties, are forced to disappear.

While Rome drew much from Greek, as from Oriental sources, there is a marked difference, aside from structural principles and developments in the two styles. The Greeks delighted in contrasts, as of decorated with plain surfaces and of minor variations of detail. The Romans cared more for effect gained by repetition of motive; the mind is not excited to an active artistic delight, but is impressed with a vague sense of sublimity. "Therefore," some one has said, "an interior like that of the Pantheon, with its simple divisions, its surfaces so sparingly broken, its immense dome brooding equally over all, conveys a sublime idea of unity, which is perfectly expressive of the character of the Romans."

The early Christian basilica reflects the struggles and ideals of the early church not only in its symbolism but in its very structure. The rugged exteriors, such as one still sees in the churches of Ravenna, illustrate the contempt for externals on the part of the founders of Christianity, while the splendid interiors, gleaming with mosaics and polished stones—not infrequently borrowed from pagan structures—reveal the richness of the inner life. The effect of unity, due to the centring of interest upon the high altar, the logical arrangement of the parts, and the clear illumination—as contrasted with many mediæval works—indicate the debt of their builders to classic art in much the same way that the writings of the Fathers reflect not a little of pagan culture and philosophy.

In Byzantine architecture we have a strange commingling of Eastern and Western ideas, but with eventual unity of effect and clearness of statement. The principles of Roman and Oriental construction were adopted and applied with Greek logic till, in Sta. Sophia at Constantinople, we have an interior unsurpassed, if not unequalled, in the works of man. A recent writer has said: "Sta. Sophia, developing a great structural principle in broad daylight with unexampled logic and daring, addresses itself entirely to the intellect. St. Mark's, sensuous and contemplative, with its dark splendor of coloring half seen, half guessed, in the rich obscurity of its vaults, addresses itself entirely to the emotions."

Arabic architecture and the Arabic influence in European work are frequently passed over by the historian as something apart or of little concern to the technical student of architecture. That this influence was considerable in later mediæval work is now appreciated, and to the student of civilization the Arabic styles are of vast importance, for in their architecture, as nowhere else, the peculiarities and weaknesses of the race can be grasped. The spasmodic, impulsive,


Pont du Gard.

short-lived brilliancy of action of the Arabs is stamped indelibly upon their architectural works. The lack of reason and prevalence of passion, as a determining motive, are reflected all too frequently in the structural weakness, the lack of unity and coherence, and the active energy revealed in their structures. "The arch never sleeps," the Arab is said to have asserted. Really he would not let it take the form of repose that was prevalent in the classic Roman work, but distorted it into fanciful though frequently elegant shapes. Most Arab buildings are as if built for momentary enjoyment and in accordance with a momentary caprice.

The characteristics mentioned are particularly conspicuous in the architecture of the Moors, as seen in the Mosque, now the Cathedral, of Cordova, and in that highly romantic structure, the Alhambra Palace at Granada. Some Arabic structures, as the later mosques at Cairo, and particularly derivative styles, as the Mohammedan works of Persia and of India, exhibit truly monumental qualities, based upon earlier traditions in those regions and clothed with decorative detail that in grace, imagination, and appropriate richness has never been equalled.

Romanesque architecture, as the name suggests, was derived from the Roman, but shows great variety and bears much the same relation to the parent style that the Romance languages do to the Latin. In spite of the variations of type, there is a certain unity in the style, due to the chief common problem—the building of a monumental and fireproof church—and to the similarity of the conditions under which the builders labored.

Whether the great Lombard churches of northern Italy were built by the Lombards themselves or by Eastern craftsmen working under their direction, the style reflects the characteristics of the Lombard race. Power, vigor, initiative are all evident in these churches, and yet also the inability of the builders greatly to lighten their fabrics or to free them from the essential inertia of their Roman prototypes. St. Ambrose at Milan, in spite of its extensive restoration, and S. Michele at Pavia are typical examples of this phase of the style.

In Tuscan works, such as the cathedral group at Pisa, the Eastern influence is more noticeable, and it was the decorative rather than the structural problem that concerned their builders primarily. Delicacy of detail, beauty of color, charm of atmosphere are all present in these delightful works.

In the south of Italy and in Sicily, as seen in Palermo Cathedral and in the splendid Royal Chapel in the same city, the buildings were the result of a curious commingling of various influences and traditions, viz., the classic, the Byzantine, the Saracenic, and even some slight impress of the Normans, the masters of southern Italy at that time. Marion Crawford, in his delightful book "The Rulers of the South," has traced these influences and embellished his descriptions with a wealth of romantic tales and traditions.

St. Trophîme at Arles illustrates the rural character of the monastic work in France. A certain general resemblance to the Lombard churches of Italy is noticeable, but with the local characteristics emphasized.

The great domical churches of southwestern France at Cahors, Perigueux, and Angoulême record, let us hope, for ages to come, the evidence of a great overland and maritime trade with Venice and Constantinople, bringing in its wake ideas and principles of construction and decoration, as well as polite literature and Eastern culture.

Who can look upon the great Norman churches of Caen—St. Stephen's and the Trinity—without seeing reflected in them the qualities of their builders—William the Conqueror and his wife Matilda?

Durham Cathedral illustrates the Norman style in England, where the essential features of continental work were retained, but with greater material resources, the architects were enabled to enrich their structures with elaborate carvings and to decorate their walls with beautiful paintings, but slight traces of which remain to suggest their effectiveness.

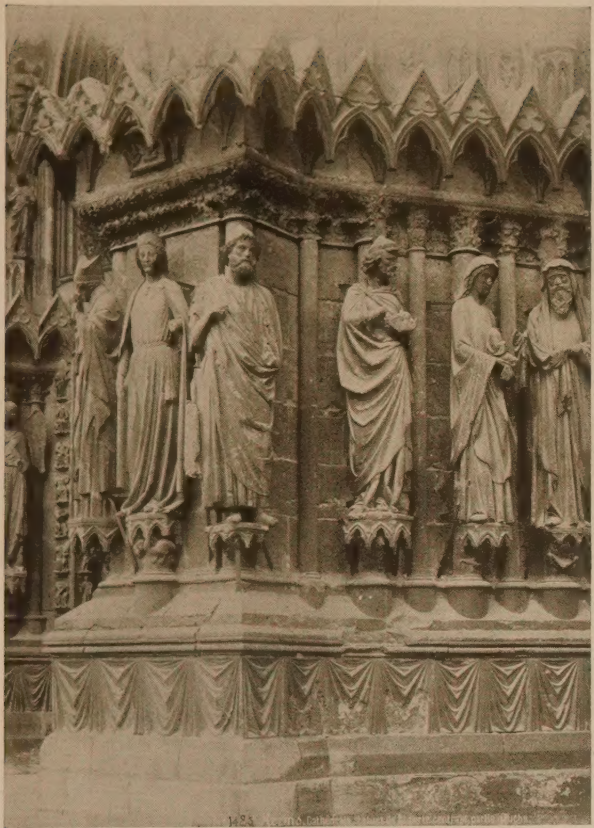
Space will permit but a passing glance at the splendid series of round-arched churches of the Rhine Valley. Spires, Mainz, Worms, Bonn, Laach, and the group at Cologne tell us with unfaltering accents of the power and lofty purpose of the men who laid their foundations and reared their picturesque masses.

Gothic is the only architecture known to us, with one possible exception—the Arabic—that possesses the quality of energy, *i. e.*, strength in action as contrasted with strength in repose. Viollet-le-Duc's ideal cathedral illustrates this in a marked degree.

Art always works somewhat mysteriously, and it never manifests itself, at least not in the form of a great historic style of architecture, till it has behind it a combined and united effort. It was this effort that was taking direction and gathering momentum in the so-called Romanesque period. In the twelfth century, and especially in the Ile de France, the structural system of the new style was perfected. The Gothic period was an age of vigor and virility, and these qualities were reflected in the almost fiercely energetic features of Gothic architecture, and structurally, at least, the exhibition of vital energy is the supreme motive of Gothic works. That the term Gothic should be limited to the great vitalized architecture of north central France all will not agree. Surely there were manifestations of a more peaceful contemporaneous art in England, retaining many of the elements of quiet repose of an earlier style and developing a decorative treatment unsurpassed in refinement and appropriateness. Still, the fact remains that, as an expression of the essential characteristics of the time, continental Gothic, and more especially French Gothic, stands quite apart.

A type of the Gothic, and indeed one might well say the masterpiece of the style, was Rheims Cathedral, the coronation church of France. Essentially and peculiarly a national monument, it is no wonder that it should have been singled out for destruction during the late war, and only the splendid stability of its structural members prevented its entire collapse beneath the repeated German bombardments. Rheims alone might well serve for a discourse upon the subject I have chosen, for the building even yet, in its damaged condition, is an encyclopædia of mediæval life.

Mediæval iconography is a complex and difficult subject, and it changed and developed as quickly as technic in sculpture. Emil Mâle, especially in his "Religious Art of the Thirteenth Century," has set forth with unusual clearness and sympathy the essential qualities of Gothic art. Allegory, symbolism, and reminiscence are important elements in mediæval decoration. In a general sense the cathedral was the Bible of the poor, but doubtless much of the decoration baffled his understanding, as it has many modern archæologists learned in all the intricacies of mediæval thought. One reason for this is that the religion of the common people was somewhat sharply differentiated from that of the priests. The religion of the clerks and doctors has come down to us in literature; that of the common people has largely disappeared, except in the miracle-play and in the traditions of certain festivals. In general, it is the most subtle, the most intellectual type of scholastic philosophy that is reflected in the sculpture and stained glass



Statuary, Rheims Cathedral.

of the Gothic church; however, the popular religion does sometimes appear in the grotesques and in some guild windows.

The "Encyclopædia" of Vincent of Beauvais, tutor of the children of Louis IX of France, comprised all human knowledge catalogued under the head of four "mirrors"—the mirrors of nature, science, morals, and history. This same encyclopædic tendency is seen in the cathedral decorations. Gothic artists probably did not set out to illustrate Vincent of Beauvais, but inherited the same scholastic philosophy. M. Mâle has shown that the façades of the great cathedrals possess a unity and comprise an artistic composition corresponding to several or all the mirrors of nature, science, morals, and history.

A suggestion of the comprehensiveness of the decoration of a Gothic cathedral may be gained by a glance at the sculptures of the west front and north transept of Rheims. Christ, the Virgin, saints, apostles, and royal personages occupy positions of prominence, while minor characters, allegorical figures of vices, virtues, signs of the zodiac, and labors of the year, clothe the archivolts and fill the most diverse areas with consummate grace. The figures of Elizabeth and Mary of the Visitation group, while nobly grand, are intensely human, and the St. Joseph of the Presentation, on the opposite jamb, is the embodiment of the typical thirteenth-century Frenchman of any market town. The Portal of Judgment of the north transept contains—still undamaged, I am told—one of the grandest figures of mediæval art in the statue of Christ on the central pier. The production of this figure illustrates one of the most human aspects of mediæval life: a cloth-merchant, convicted of the use of a false yardstick, was required to supply the chief decoration of this porch, and his ignominy is still advertised in the sculptures of the pedestal beneath the feet of Christ. In the Last Judgment, above, the usual realistic resurrection, separation, and reception by God the Father, or condemnation to the fiery furnace, appear.

What could be more naïve than the Adam and Eve decorating a hollow moulding or more sinister than the weird face gazing down from a lofty height?

A comparison of the attitude and conception of the designers of the twelfth, thirteenth, and fourteenth centuries is well seen in the figures of the Madonna in the early entrance of the north transept of Rheims Cathedral, on the central pier of the west front of Rheims, and of the south porch of Amiens. We have here simple and serene motherhood, the supercilious *grande dame*, and the too-charming woman that Ruskin so well described as the soubrette type.

The interior of a French Gothic cathedral has never, perhaps, been better characterized than by the great Abbot Suger of St. Denis, who, writing of his own abbey, said: "When the house of God, many-colored as the radiance of precious stones, called me from the cares of this world, then holy meditation led my mind to thoughts of piety, exalting my soul from the material to the immaterial, and I seemed to find myself, as it were, in some strange part of the universe, which was neither wholly of the baseness of earth nor wholly of the serenity of Heaven, but by the Grace of God I seemed lifted in a mystic manner from the lower toward that upper sphere."

Perhaps no single structure illustrates better the peaceful atmosphere, beautiful surroundings, and quiet repose of the English Gothic than Salisbury Cathedral. Lichfield, Wells, Lincoln, and York all have their special merits, among

Statuary, Rheims Cathedral.

which are picturesqueness of mass and refinement and singularity of detail.

Innumerable parish churches of Great Britain illustrate the charm of the style quite as much as the larger buildings. Indeed there is an intimacy and quaintness about them that make them particularly appealing, and their arrangement and general design express most clearly the local traditions and customs.

Reasonable conservatism is a quality generally conspicuous in English Gothic architecture, as it is in British character, but the venturesomeness, even the dash and brilliancy that appear in the conduct of British military leaders are not lacking in architectural works. King's College Chapel at Cambridge is a notable example of this, where the structural daring and unity of effect are equalled in few continental Gothic buildings.

An exceedingly interesting field from the point of view of the political historian is that of military architecture: the Norman and later castles of England and Scotland, as well as the châteaux of France, the castles along the Rhine, and the fortresses of Italy. In all we see how the exigencies of mediæval warfare were considered and met with a fertility of invention and structural capacity coupled with an apparently instinctive æsthetic sense scarcely found elsewhere in the history of architecture. And these structures not only reveal military prowess on the part of their builders; they remind us that the ability of a handful of men, defending a fortress, to resist for months the attacks of a numerous and veteran army led to boldness and even insolence on the part of the weak toward the powerful which foreshadowed modern democracy.

The Tower of London, the White Tower of which was built by the bishop of Rochester not long after the Norman Conquest, has been the scene of innumerable tragic events in British history. Edinburgh Castle, perched high on its rock, dominates the town as it did in the beginning, when the fortress gave its name to the adjacent community. Stirling and Linlithgow, steeped in the romance of Scottish history, still appeal by their picturesqueness and rugged grandeur.

The Châteaux de Saumur, as shown in a "Book of Hours" in the Château de Chantilly, was a characteristic castle of northern France, with the walled town at its side and the peaceful labors of the field proceeding under its protection.

The Louvre of Philip Augustus was one of the proudest of its class, but scarcely superior to that of Coucy, the tower of which succumbed only toward the end of the late war. Viollet-le-Duc declared this donjon to be the finest work of the sort in all Europe. The pride and independence of the builder was set forth in the family motto, which may be freely rendered: "I am not king, nor prince, nor duke, nor count; I am the lord of Coucy."

Carcassonne, in spite of extensive restorations, and Avignon, as it once existed, awaken a long chain of memories of military glory and ecclesiastical schism, the following out of which would confirm our belief that architecture is a living witness and the very stones are eloquent.

The Château Gaillard, built by Richard the Lion-Hearted, commanded the Seine and protected Rouen, the Norman capital. Many historians and novelists have attempted the description of the attack and capture of a mediæval fortress, but I know of none that equals that of Charles Reade in "The Cloister and the Hearth."

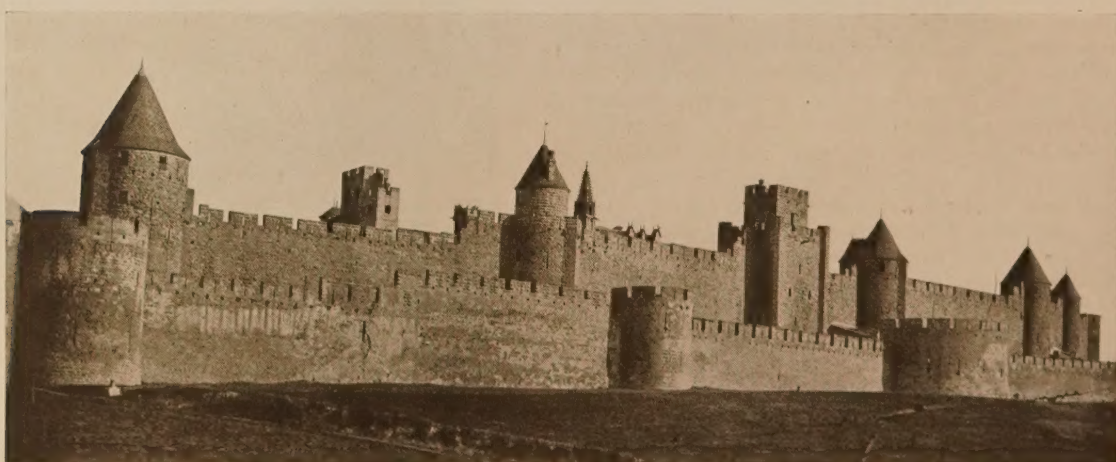
Who has not succumbed to the romantic atmosphere of the Rhine in song and story if not as revealed in such picturesque structures as Rheinstein Castle?

Italy still retains many walled towns and quaint fortifications, and the Castle of Milan was a stronghold which for military strength and architectural merit scarcely had its equal north of the Alps.

Not only were the dwellings of the great feudal barons strongly fortified, but monasteries at times occupied strategic positions and defied attack with impregnable defenses. Mont St. Michel, above all, preserves its charm in spite of restoration and threatened commercialization.

The Palazzo Vecchio, at Florence, for long the seat of the ruling body of the city, still asserts in its every line the dignity of the law and its contempt for hostile act, whether that of political opponents or furious populace.

We might go on indefinitely, examining the human aspects of mediæval architecture in the lesser domestic structures of the Middle Ages, eloquent examples of which remain in all European countries. More spontaneous, less ambitious and affected than their great neighbors, bearing much the same relation to each other as the simple parish church to the cathedral, they are priceless human documents, displaying a resourcefulness and integrity coupled with a simple contentment of which our present-day world stands much in need.



Carcassonne.

The New Orleans Raised House Type

By Morgan D. E. Hite
Chairman Louisiana State Housing Commission

THESE houses exhibit the "raised house type," which is quite distinctive of New Orleans and is not found elsewhere. It has been evolving for some years from the original Spanish type of plantation house (1769–1803), which was built with all rooms on one floor, and raised on heavy square brick pillars nine or ten feet above the ground. The soil was damp and no excavation for cellars was possible, so that the whole basement story was above ground, and frequently left entirely open underneath for free circulation of air or latticed in between the brick or stuccoed piers with green diagonal lattice. Sometimes kitchen and dining quarters and other service rooms were partitioned off. Another reason for the raising of the houses on basements in Louisiana was the possibility then of river and bayou overflows.

In New Orleans proper there were many hundreds of this general type of house built, but on a smaller scale, to fit city lots and to satisfy the demand of the population for rooms all on one floor.

House, John L. Cahill, New Orleans, La. Morgan D. E. Hite, Architect.

The climatic conditions made life easier by horizontal traverse of a building than up and down, and to this day in the extreme South, as represented by Louisiana and New Orleans, the ground floor of any building has an overwhelmingly greater value, because the shopping public is averse to going "up-stairs" to buy or to eat, or for anything except to regular business offices, and not these unless served by good elevator service.

The one-floor house is extremely popular in New Orleans, and the universal requirement is for a raised basement. The accompanying photographs show how this has been evolved, from the original prototype mentioned above to the type now prevailing and rapidly undergoing further evolution. The "raised basement" to-day is designed as an integral part of the house, and accommodates a service entry with stairs leading up to kitchen or pantry or hall; a room for the heater or furnace; laundry, servants' rooms, storage rooms, and latterly one, two, or three fireproof garages, with fire-door access from garage to basement. In addition, fully one-third of the better-class homes of this type use the excess basement space as a "den," or billiard or card-room for the men-folks, or it is floored as a dancing area for the young folks. These raised basements have the floor practically at ground level, made of concrete or creosoted cinders floored over, and are thoroughly dry and well-windowed and ventilated. The houses here shown have garages in this basement, some at side, some at rear. The usual height from grade to house-floor finish line is eight feet.

The raised house has practically displaced all other types in this city, since people have begun to buy wider lots than was formerly the case, the narrower types, such as marked "residence of John L. Cahill," being built on forty-five feet width, and that marked "residence of Mrs. W. H. Dielmann," built on sixty feet, the "residence of Mrs. Richmond Martinez" being built on one hundred feet.

Some of the more expensive homes are built two stories high, and wherever the servant problem is not serious the two-story is liked, because the sleeping-rooms are off the ground, but even many expensive homes are now being planned all on one floor, and this type has quite a future, due to the great number built and to be built, enabling the architects here to evolve something entirely new in mass and planning, due to the difference of the problem from what has been customary.

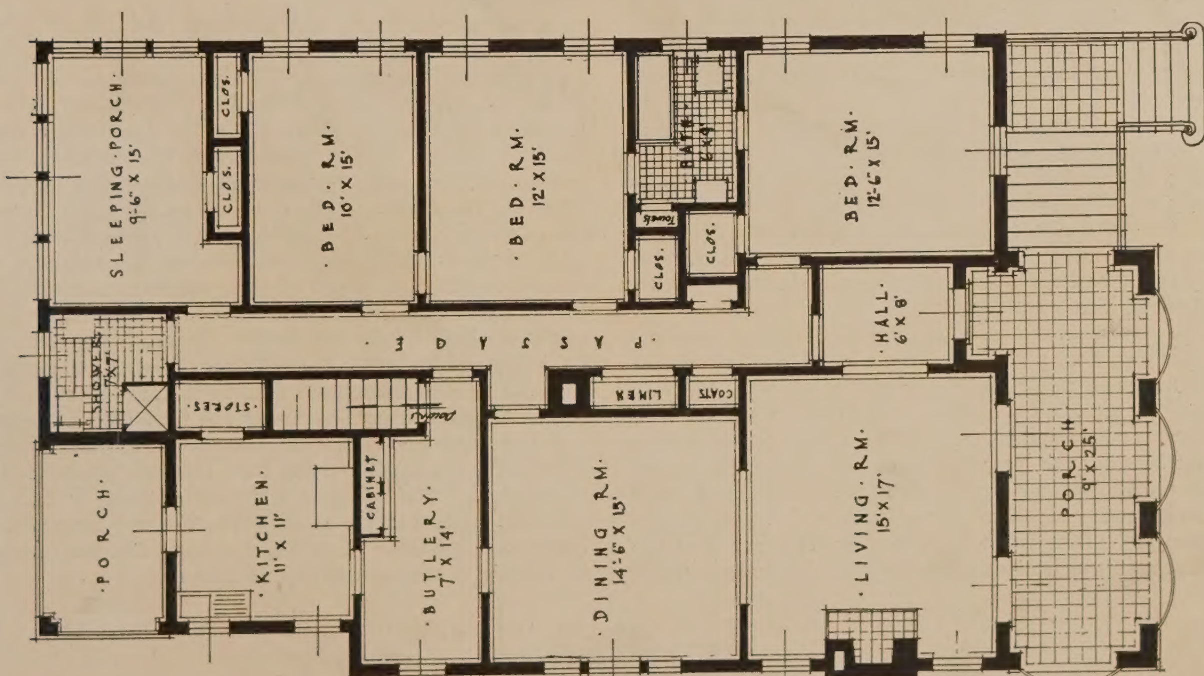
The convenience of the one-floor house, from a housekeeping standpoint, is worth attention. The practical minds of the New Orleans women and the newcomers from other sections of the country immediately see the advantages of this combination of main floor and raised basement.

We have done considerable work along this line, and recognize the problem as a new one in American architecture —or, for that matter, in any country's architecture, although something of the Louisiana raised house is discernible in Manila and the suburbs of some of the Spanish-speaking tropical places, showing the parentage of this house to be Spanish, although, as the pictures show, it has somewhat departed from the original to meet modern mandatory needs.

(*Continued on page* 150)

HOUSE, MRS. W. H. DIELMANN, NEW ORLEANS, LA. Morgan D. E. Hite, Architect.

HOUSE, MRS. RICHMOND MARTINEZ, NEW ORLEANS, LA. Morgan D. E. Hite, Architect.



HOUSE, PAUL MEYER, NEW ORLEANS, LA. Nathan Kohlman, Architect.

(*Continued from page* 147)

The raised house gets the sleeping-rooms well off the ground, one of the chief desires of the people here, New Orleans being a flat city at sea-level, and still possessing a traditional dislike for dampness, although the great mechanical drainage works here have long since lowered the water-line many feet below the surface, where once upon a time it was within a foot of the top of the ground. Besides, the rainfall here is tropical in its volume, and it is desirable to keep the rooms moisture-free, and this we succeed admirably in doing with the raised-basement house.

Last year the Southern Pine Association contracted with the Architects' Small House Service Bureau of Minneapolis to produce a book of plans, and asked this office to make suggestions which might be helpful in enlarging its value. We suggested that some of the Gulf Coast raised-basement houses be shown, and the writer made a trip to Minneapolis with this in view, resulting in the incorporation of plans and designs for three houses of this type. In Minneapolis a young Southern architect, Mr. Jefferson Hamilton, entered sympathetically into the work of planning this type of house, so foreign to the Northern architects, and almost totally unknown to architects elsewhere. Mr. Hamilton's designs have proved among the most popular shown in the book, and, in particular, one of his raised-basement types has been used widely as a means of advertising the beauty of design which was the object of the whole plan book. Mr. Hamilton's houses are based on photographs and sketches of houses we had built in New Orleans, and, to the writer's knowledge, is the first presentation of the raised-basement type publicly made, hence we think something more on this subject will prove of interest to you.

Attractive Brick House of English Style

Meyer & Holler, Architects

By Charles Alma Byers

IN the Plate is shown an exceptionally charming representation of an English style of architecture. As reference to the floor plans will show, the house is actually of quite moderate size, as compared to what the appearance it presents to the street tends to indicate.

The outside walls are of dark-red brick of very rough texture, with so-called clinker brick liberally introduced to produce a still more rustic exterior. The mortar used for the brick is tinted a rich cream, and the principal trimming is also in cream. The oriel window-group, or bay protruding from the front of the second story, however, as well as the front door, is largely finished in olive-brown. The roof covering consists of split shakes instead of ordinary shingles, and is painted a dark shade of olive-green, while the rustic wood shutters at some of the windows are painted olive-green to match.

The front doorway, it will be observed, is constructed with an arched or rounded top, and there is a delightful lounging porch on one of the rear corners, with somewhat similarly arched openings or open windows on each of three sides. Both the entrance stoop and the lounging porch, as well as all walks, are paved with brick. The windows are mainly of the casement type, and those of the first floor are nearly of full inside wall length.

The arrangement of the interior will be noted from the accompanying floor plans. Points and features deserving of special notice in this connection are, for instance, the way in which the stairway is designed to ascend from a corner of the living-room, together with the lavatory accessible from the first landing; the introduction of French doors at either side of the living-room fireplace to give access to the rear garden; the use of a pair of wide glass doors between the living-room and dining-room, and, further, the fact that the first-floor rooms include a delightful den and a charming little breakfast-room. The lounging-porch referred to above will be noticed to be accessible either from the den or indirectly from the living-room and a protecting overhang of the second story. On the second floor are three bedrooms, two bathrooms, and some unusually roomy closets.

The built-in features include a bookcase in the den, a buffet in the breakfast-room, a cabinet ironing-board on the rear-entry porch, a draught cooler-closet, a great deal of cupboard room and other conveniences in the kitchen, a linen cabinet in the up-stair hall, a medicine-case in each of the bathrooms, and a cabinet of drawers in one of the bedroom closets.

The interior finish and decorative scheme is quite in keeping with the outside appearance and attractive, although but moderately expensive. The woodwork in the living-room, den, and dining-room consists of California redwood, finished with a waxed surface and left in possession of nearly its natural color. In the remainder of the interior the woodwork is Oregon pine. In the breakfast-room and bedrooms, including the up-stair hall, it is finished in old-ivory style, and in the kitchen and bathrooms it is in white enamel. The walls of the breakfast-room are panelled to a height of four feet six inches, and in the kitchen and bathrooms they are finished with a smooth, hard plaster coat to the same height and enamelled like the woodwork. In the living-room, dining-room, and bedrooms the walls are papered, and elsewhere they are tinted. Hardwood flooring is used throughout, except in the kitchen and bathrooms, and tile is used in the latter.

The house possesses a large basement, reached by an inside stairway accessible either from the dining-room or from the outside. The equipment includes a good furnace and all other modern conveniences. The house is located in the Hollywood suburb of Los Angeles, Cal., and was designed by architects Meyer & Holler, of that city.

Editorial and Other Comment

Small Houses and Their Cost

APPARENTLY the period of waiting for old times to come back again has been a waiting for the impossible. Pre-war prices, according to the best informed authorities, are among the things that we can only talk about and forget. They will never come our way again, any more than the other things that went with them, low rents and comfortable living on the basis of pre-war incomes.

The cost of materials has shown a decided tendency toward lowered prices, but even so the tendency is not enough to encourage any dreams of a complete return to the prices of 1914 and before.

It is not the cost of materials, however, that has been the chief cause of a lack of building, but the untoward cost of labor. Labor is the factor that has more than doubled the cost of building, and no one is willing to predict that labor is going to turn the unions into philanthropic bodies for the public welfare. Labor is, perhaps, no more selfish than the rest of the body politic, only it does seem as if the old standards of self-respect and pride of the individual in labor performed as a full equivalent for wages paid, have fallen into the discard.

There is a revival of building, but even so, nothing in proportion to the need, and the reason is obvious. We are indebted to the Chemical National Bank of New York for the following interesting figures. They are the answer to the question: Why don't you build?

A home of type *A* cost in 1914, $5,529. In 1920 the same house cost $12,815, an increase of 131 per cent in relation to the 1914 figure. In March, 1922, such a house would cost $9,502, 71 per cent more than the 1914 cost, and 26 per cent below the maximum cost in 1920.

TYPE *A*—2-STORY FRAME HOUSE

7 Rooms—Size 30′ x 34′. Contents 29,100 cubic feet
Floor Area 2,640 square feet

	1914	(Peak) 1920	March 1922
Excavation	$240.00	$420.00	$420.00
Foundations and cement	470.00	1,459.00	1,167.00
Masonry	250.00	667.00	543.00
Plastering	359.00	962.00	809.00
Carpentry and glass	2,520.00	5,629.00	3,845.00
Painting	320.00	608.00	560.00
Plumbing and gas	350.00	686.00	517.00
Heating	400.00	1,029.00	712.00
Metal work	180.00	455.00	291.00
Tile work	40.00	87.00	54.00
Mantels	80.00	173.00	109.00
Electric	250.00	500.00	377.00
Hardware	70.00	140.00	98.00
Total cost	$5,529.00	$12,815.00	$9,502.00
Cost per cubic foot	$0.19	$0.44	$0.325
Cost per square foot	2.09	4.85	3.60
Per cent of change	100 per cent	231 per cent	171 per cent

The cost of a home of type *B* in 1914 was $4,176. To build such a house in 1920 cost $9,767, 133 per cent above 1914 costs. The present cost of this home is $7,374, which is 76 per cent above 1914 prices and 24 per cent below the maximum cost.

TYPE *B*—2-STORY COLONIAL HOUSE

8 Rooms (Including 2 Attic Rooms)—Size 23′ x 41′
Contents 25,315 cubic feet. Floor Area 2,530 square feet

	1914	(Peak) 1920	March 1922
Excavation	$160.00	$280.00	$280.00
Foundations and cement	410.00	1,273.00	1,018.00
Masonry	258.00	689.00	560.00
Plastering	385.00	1,031.00	868.00
Carpentry and glass	1,030.00	2,301.00	1,571.00
Painting	304.00	577.00	532.00
Plumbing and gas	340.00	666.00	503.00
Heating	420.00	1,081.00	748.00
Metal work	187.00	473.00	302.00
Tile work	126.00	274.00	171.00
Mantels	60.00	130.00	81.00
Electric	420.00	840.00	634.00
Hardware	76.00	152.00	106.00
Total cost	$4,176.00	$9,767.00	$7,374.00
Cost per cubic foot	$0.165	$0.385	$0.29
Cost per square foot	1.65	3.86	2.91
Per cent of change	100 per cent	233 per cent	176 per cent

The 1914 cost of a type *C* home was $4,701, which by 1920 had risen to $10,913, a figure 132 per cent above the earlier cost. The cost of erecting this house in March, 1922, is $8,112, 72 per cent above the 1914 cost and 26 per cent below the peak cost.

TYPE *C*—2-STORY SHINGLE HOUSE

8 Rooms (Small)—Size 26′ x 35′. Contents 24,360 cubic feet
Floor Area 2,385 square feet

	1914	(Peak) 1920	March 1922
Total cost	$4,701.00	$10,913.00	$8,112.00
Cost per cubic foot	$0.193	$0.448	$0.333
Cost per square foot	2.00	4.64	3.68
Per cent of change	100 per cent	232 per cent	172 per cent

The rise in prices and wage increases between 1914 and 1920 more than doubled building costs between those two dates. The subsequent decline, while not sufficient to restore costs to the old level, has brought about a very material decrease in construction costs, the fall in costs in two years amounting to 25 per cent of costs at the peak.

The prospective builder is, of course, interested in knowing whether he may look for further declines, for which he should wait. It would be beyond the scope of this article

to attempt to forecast the course of building costs in the future. General wholesale prices, as measured by the index number of the U. S. Bureau of Labor Statistics, seem to be stabilized at a level about 50 per cent above that of the pre-war period. Building costs are above this level, but many of the elements which bulk large in building costs, such as freight rates and wage rates, are less susceptible to downward revision than are commodity prices in general. The general housing shortage, and the increasing volume of building at present price levels are factors which serve to strengthen building material prices. While it is entirely possible, therefore, that building costs may decline still further, it is not probable that drastic declines will occur.

If these facts do not seem especially encouraging, to fill with gladness the hearts of those who are looking forward to the better times that have been so long predicted, we may yet say that there is every indication of an unprecedented amount of building in spite of costs.

The housing need has become something more than a matter of speculation; it has assumed the acute stage where something must be done. And when something arrives at this point a way is always found to do it.

Encouragement

THERE are already abundant present indications that the future is going to be a season of "feverish activity," according to the *American Contractor*. The figures for March are indeed "astonishing" compared with recent years. But the way of continued progress does lie in rigid economy of time, of labor, and of materials. The architect who is wise enough to simplify and do away with needless luxuries in the way of construction will be sought. Some of the things considered essential in the modern house of 1914 may often be classed with needless luxuries to-day. Some of them, if not in the plans, wouldn't be missed.

"The Bill-Board Blight"

THIS is the title of the Bulletin of the Municipal Art Society of New York. The Blight is something that offends the sense of decency of every man or woman who looks about our cities or wearies of the interminable and incredibly stupid signs that share with the telegraph-poles the fleeting vision of the tired traveller. One longs to look over the passing landscape and our city streets freed of invitations to investigate the qualities of malted milk, pain-killers, chewing-gum, and the hundred crudely advertised things that we'd buy more cheerfully and with less resentment if their names were not continually plastered all over the open places.

It would not be seemly for us to deny the efficacy of well-considered advertising, but these bill-boards seem to us not only ill-considered but a positive affront to our sense of the fitting.

What are we going to do about it? Tell the advertisers they are wasting good money; write them and tell them that every time you see one of their bill-boards you are "agin it" and the thing it proclaims. In time maybe laws will be passed that will protect us from these eyesores.

Amendments to the New York Law for the Registration of Architects

ONE of the principal amendments is that which makes it the duty of the attorney-general to prosecute offenders. The want of a clear provision on this point in the law as originally enacted has handicapped the regents in its enforcement.

Another amendment which will interest many readers is that which extends the exemption period. It will now be possible for competent architects who were in actual practice in New York State prior to the 28th day of April, 1915, to obtain registration certificates without examination if their applications are filed before the end of the current year, 1922, and on condition that they satisfy the board as to their qualifications. All such architects may continue to practise without a certificate if they so desire. The amendment of the law does not affect the requirement in this respect, except to provide that every architect practising without a certificate will have to file an affidavit that he was in bona fide practice one year before the law was enacted.

A third amendment to the law requires the payment of an annual fee by every registered architect in the State. This amendment was made at the request of the regents, who consider that this requirement will prevent fraudulent use of certificates, and keep the list of registered architects free from dead-wood. The annual fee for re-registration is $2, payable on or before September 1.

The other amendments are chiefly verbal ones in the interest of making the law more concise and clear, and removing one or two ambiguities.

One item of interest to the profession will be that a definition of an "architect" is now incorporated in the registration law, which reads as follows: "'Architect' means one who designs plans for structures and superintends or supervises their construction."

There is no change in the fundamental requirement of the law, that no one can practise architecture in New York State, or call himself an architect, without obtaining a certificate of registration, with the exception of those who were in the practice when the law was originally enacted.

The attention of all registered architects should be called to the fact that each is subject to heavy fine if he does not have recorded in the office of the county clerk in the county in which the applicant resides his certificate of registration, and have the certificate stamped upon the back by that official (fee $1). In case of loss of the certificate the board of examiners should be notified.

Correspondence in reference to the registration law, and requests for application blanks, or information relative to the law, should be addressed to the Board of Examiners and Registration of Architects, Education Building, Albany, New York. Payment for registration and annual re-registration should be sent to the same address.

Summer Session at Carnegie Institute of Technology

A WIDE variety of subjects is offered for the summer session at Carnegie Institute of Technology, Pittsburgh, Pa. Courses of six weeks and eight weeks will be given in the College of Fine Arts, College of Industries, Margaret Morrison College, and the College of Engineering.

The work of the summer session at Carnegie is arranged to meet the needs of teachers, undergraduate students, and others interested in technical subjects. The courses for teachers are scheduled for six weeks, from July 5th to August 12th. Eight weeks' courses will run from June 26th to August 19th.

Courses are planned for architectural draftsmen who desire additional training in design and working drawings, and for those who are planning to enter the institute. Subjects offered are design, working drawings, and superintendence, and outdoor sketching.

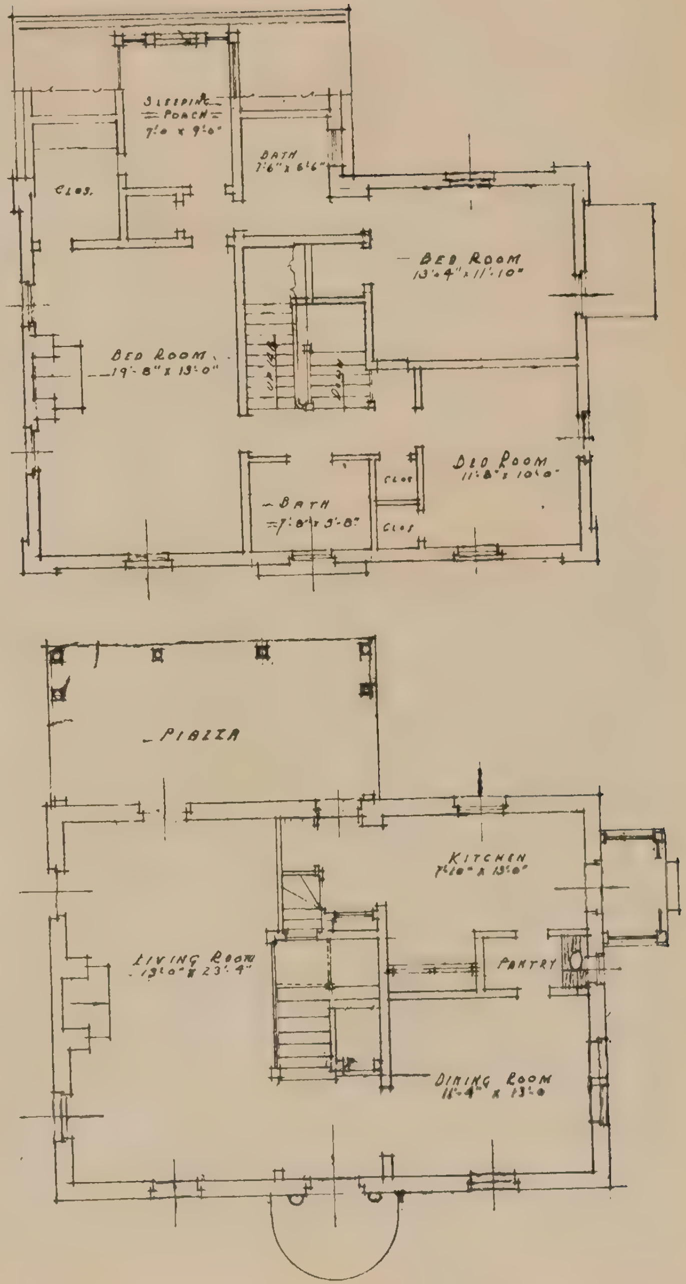
HOUSE, HOLLYWOOD, CALIF.

Meyer & Holler, Architects.

HOUSE, DR. EDWARD FISHER, ENGLEWOOD, N. J.

Aymar Embury II, Architect

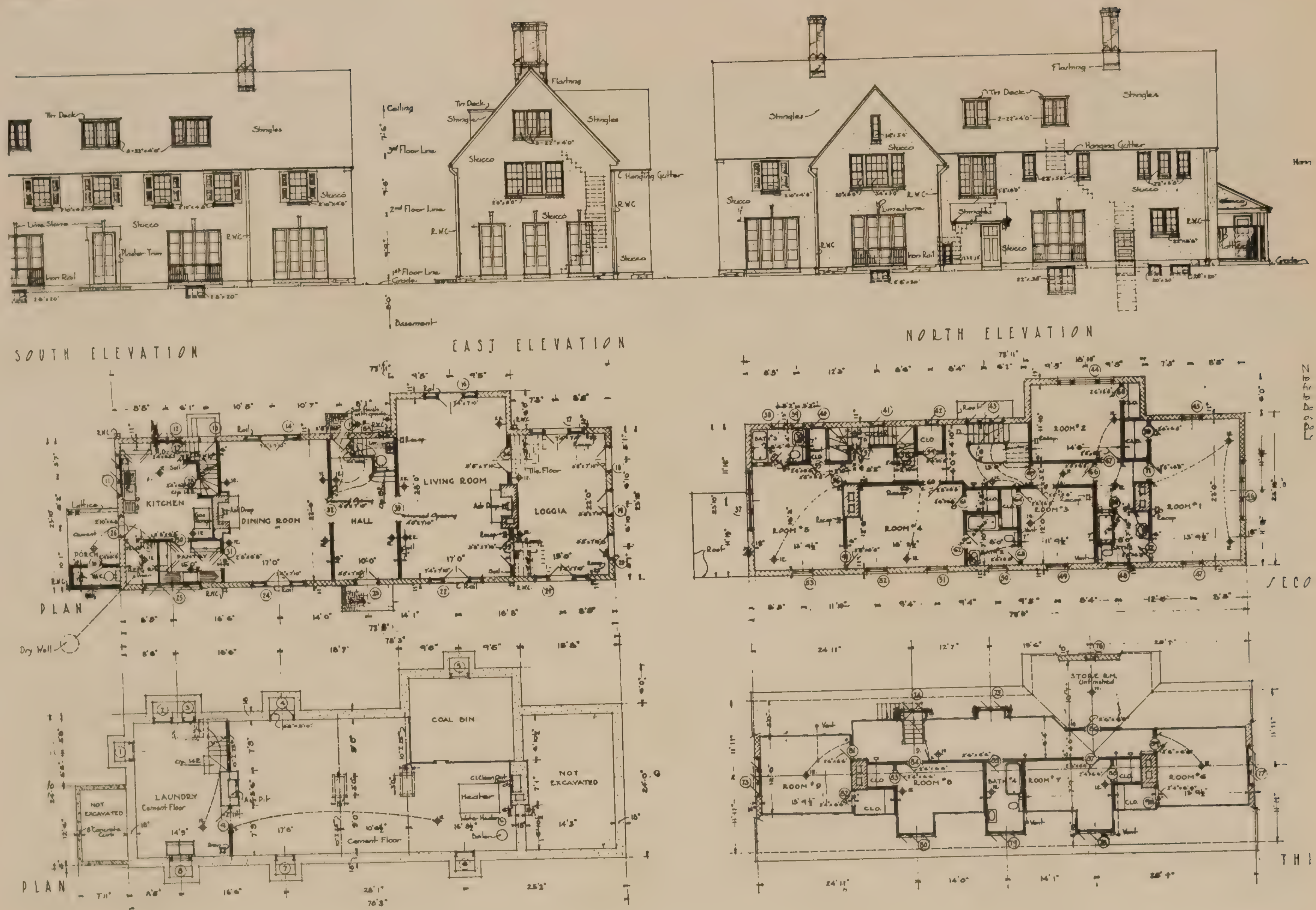
HOUSE, DR. EDWARD FISHER, ENGLEWOOD, N. J.



Aymar Embury II, Architect.

HOUSE, JOHN McMULLIN, OVERBROOK, PA.

McIlvain & Roberts, Architects.

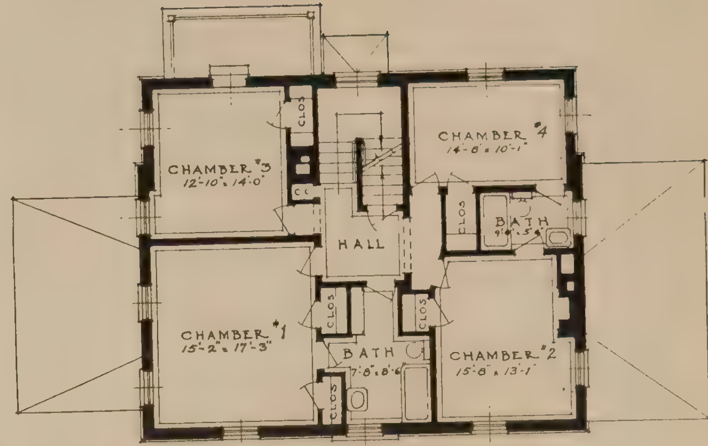


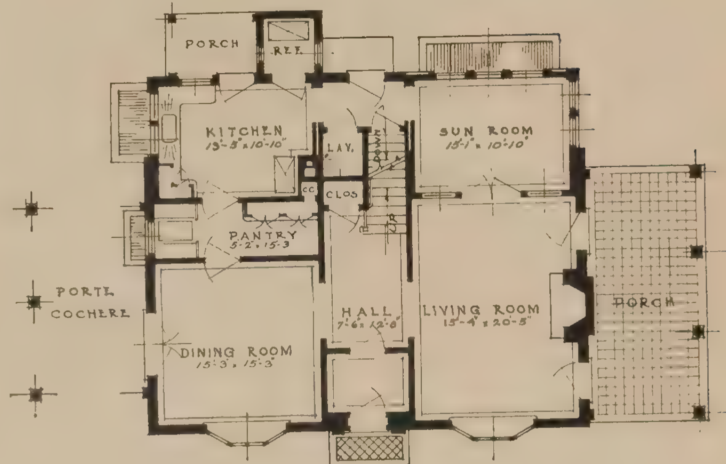
MR. JOHN McMULLIN, OVERBROOK, PENNA.

McIlvain & Roberts, Architects.

HOUSE AT CLEVELAND, OHIO.

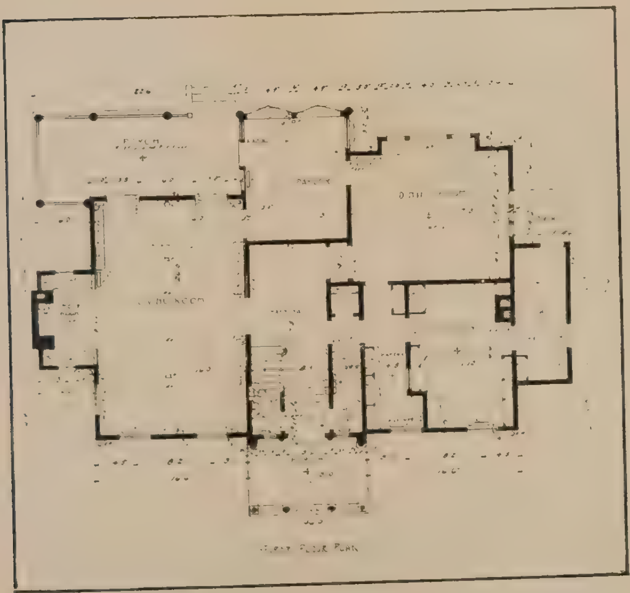
Dwight James Baum, Architect.

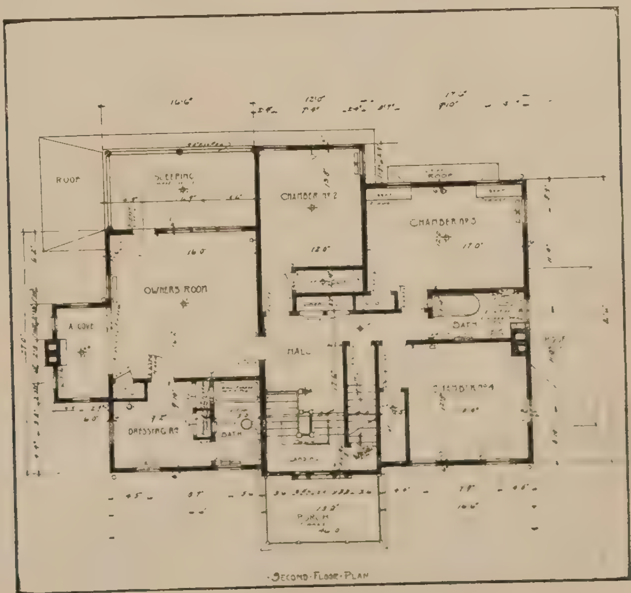




HOUSE AT CLEVELAND, OHIO.

Dwight James Baum, Architect.





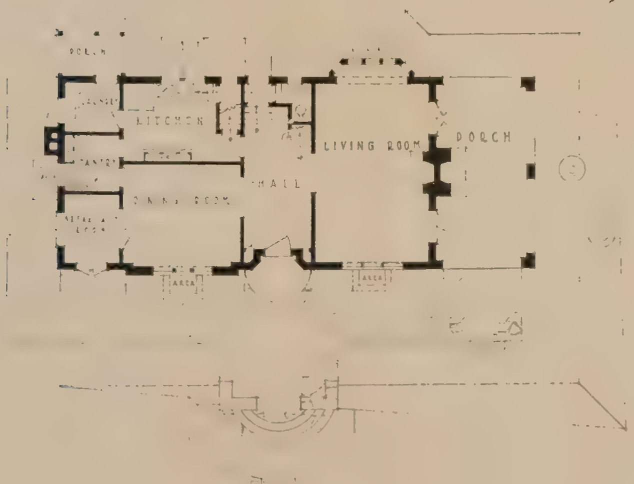
H. D. Phoenix, Architect.

HOUSE, DR. JOSEPH C. PALMER, SYRACUSE, N. Y.

HOUSE, MARGUERITE H. MONAGHAN, OVERBROOK, PA.

Paul Monaghan, Architect.

LIVING–ROOM.

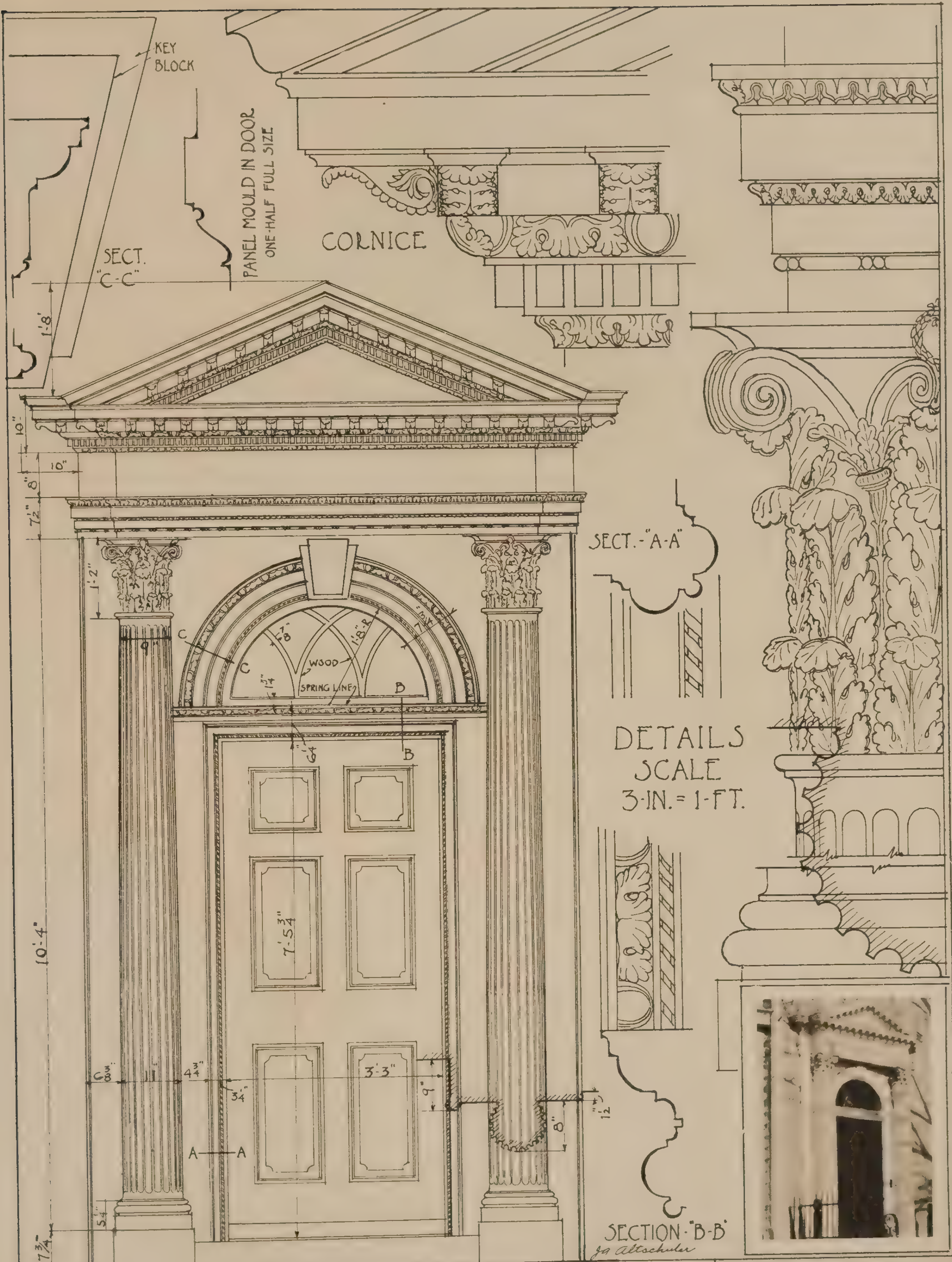


FIRST · FLOOR · PLAN

·SECOND·FLOOR·PLAN·

HOUSE, MARGUERITE H. MONAGHAN, OVERBROOK, PA.

Paul Monaghan, Architect.



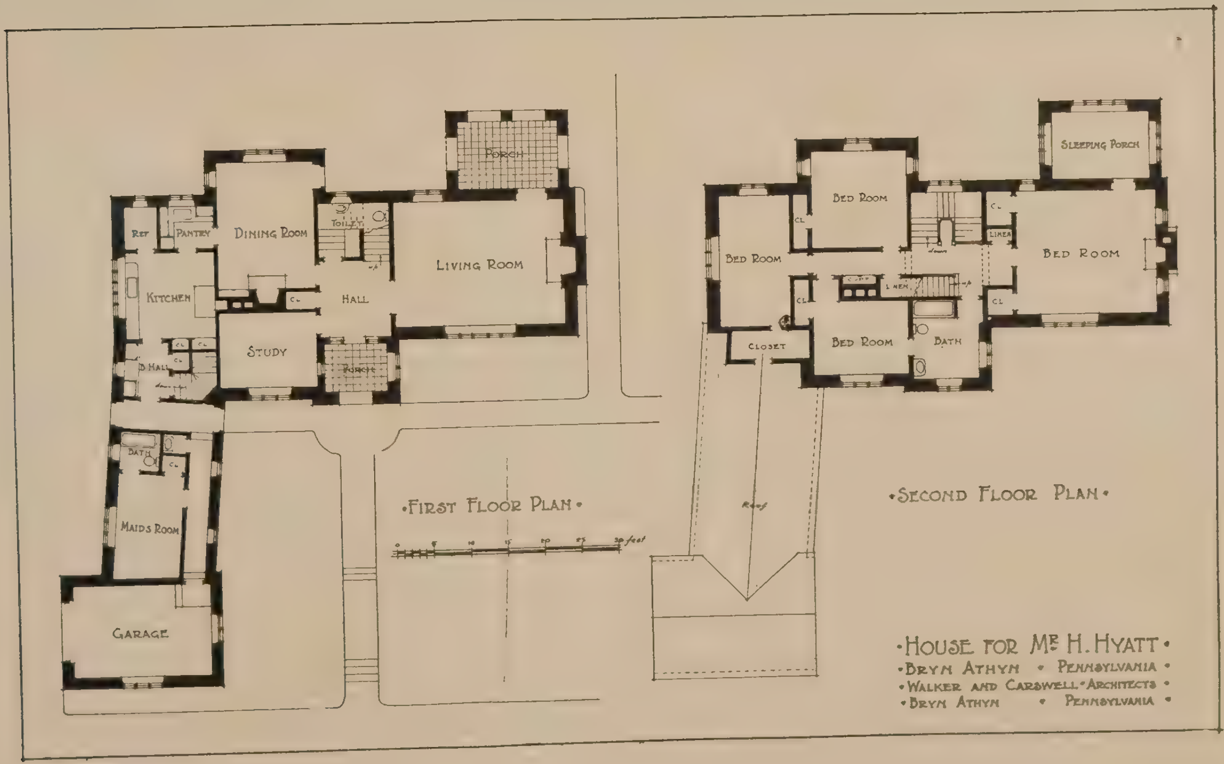
COLONIAL ARCHITECTURE of the CAROLINAS

DOORWAY - 104 TRADD ST., CHARLESTON - S.C.
DATE - 1772

MEASURED & DRAWN by J. A. ALTSCHULER

HOUSE, H. HYATT, BRYN ATHYN, PA.

Walker & Carswell, Architects.



•House for Mr H. Hyatt•
•Bryn Athyn • Pennsylvania•
•Walker and Carswell • Architects•
•Bryn Athyn • Pennsylvania•

HOUSE, MRS. ANN E. CRAIGHILL, GUILFORD, BALTIMORE, MD.

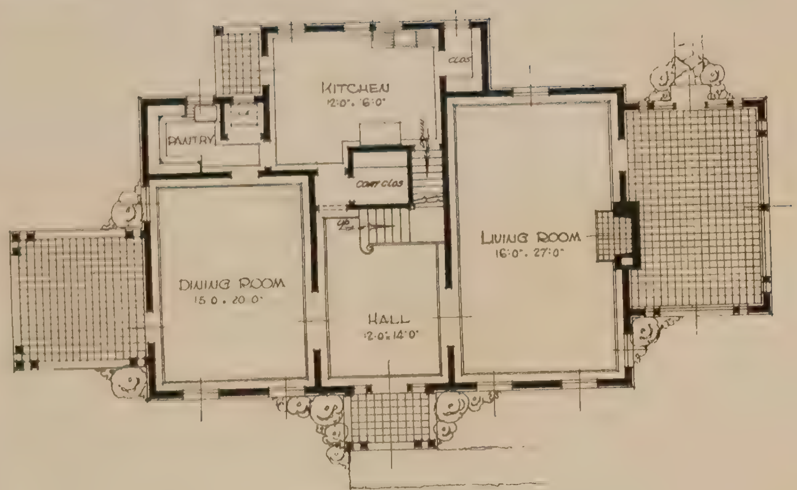
Roy G. Pratt, Architect.

GENERAL VIEW.

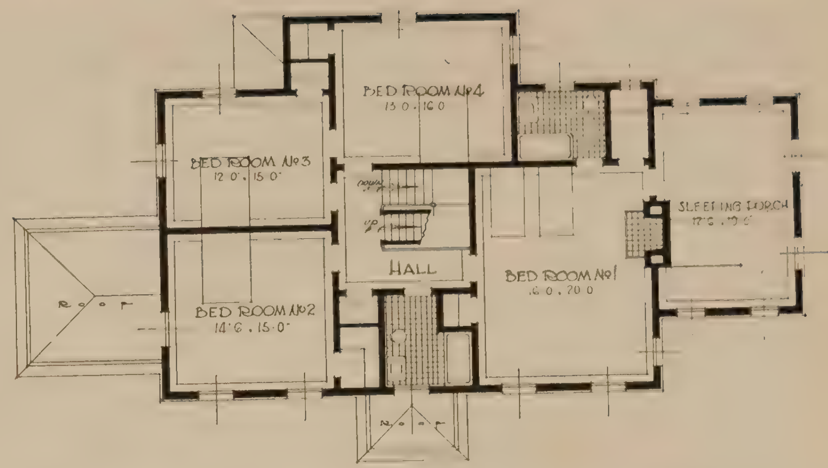
HALL.

R. C. Hunter & Bro., Architects.

HOUSE, W. H. WALKER, TENAFLY, N. J.



FIRST FLOOR PLAN



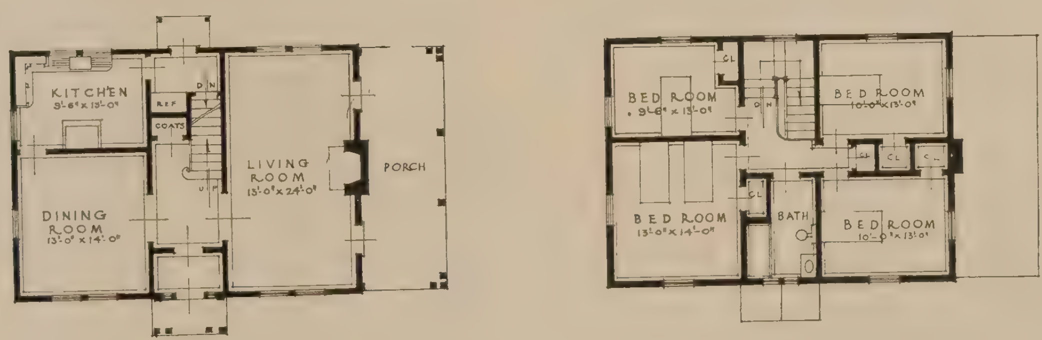
SECOND FLOOR PLAN


LIVING ROOM.


DINING ROOM.

R. C. Hunter & Bro., Architects.

HOUSE, W. H. WALKER, TENAFLY, N. J.



FIRST FLOOR PLAN

SCALE

SECOND FLOOR PLAN

HOUSE AT LARCHMONT, N.Y

ADOLPH WITSCHARD, ARCH'T
56-WEST 45TH ST. N.Y.C

Construction of the Small House

By H. Vandervoort Walsh

Instructor, Architectural School of Columbia University

Article XVIII

CONCRETE WORK AROUND THE HOUSE

CONCRETE has become such an excellent servant to the needs of various objects built around the house that no apology will be offered for devoting an article to its use. Of course, one is familiar with the artistic flagstone walk with open joints through which the grass is allowed to grow, and one cannot deny the beauty of brick pavements; but in spite of these the concrete walk is found about more houses wherever one goes than any other type, and, although in most cases very ugly, yet it cannot be relegated to the past even by the most fastidious, for its existence depends upon very fundamental qualities of practical serviceability. And likewise, although we may not have seen concrete walls that had the charm of rubble-stone or brick, yet they are coming to be used more and more, for they can be made to appear very beautiful if properly made. Concrete garden furniture, concrete pools, fountains, garden ornaments, tennis-courts, and other familiar adjuncts to the lawn about the house, are making themselves evident on all sides. There is something about the material that lends itself to such uses, for even the owner of the house can get out and work in it and need not call in a contractor.

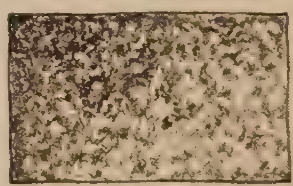
However, much of the prejudice that exists against concrete is due to its usual ugly appearance, which is no fault of the material but of the one who built with it. We see too much concrete that is dull, pasty, and gray, and marred on the surface with cobweb lines of cracks; but this need not be. Concrete surfaces can be made as brilliant as any other material by properly treating it. All that is needed to do this is to carefully study the methods of producing textures, and texture is nothing more than breaking up the surface into small patches of light and dark, so intermingled that they give interest. For example, after the forms have been removed the outside of the concrete can be covered with cement mortar, thrown onto it with a whisk-broom which will make the mortar stick to the surface in little lumps and hills. The light playing over such a surface will cast shadows in the hollows between the lumps and light up the tops of the lumps. This will give a texture of interest that is pleasing to the eye. On the other hand, the cement mortar may be plastered over the surface of the concrete and used as a sticking bed to hold small pebbles of different colors and shades thrown against it. These pebbles will be colorful, and some dark and dull and some light or sparkling like glass. Thus a play of broken light will be thrown back from the surface to the eye, and the observer will be pleased. Then, too, the outer layer of the cement which was next to the forms may be composed of white cement and some aggregate like small chips of marble. When the forms are removed it will be found that this beautiful aggregate will not show, but the entire surface will partake of the monotonous white or gray of the cement. However, if this thin coating of cement is removed, then the variety and sparkle of the aggregate below will be revealed. This might be done by striking the surface all over with a stone-cutting tool which is used to surface stones, or it might be done by a scrubbing or rubbing with carborundum blocks. There are innumerable ways by which texture can be developed on anything made of concrete, and experimenting in this line is a most fascinating employment. For this reason, if properly handled, concrete is particularly adapted to the making of all kinds of house accessories, since it is also easily shaped in moulds.

The materials used for this concrete work have much to do with its success. Ordinarily there is no need of inspecting the cement, for most of the well-known brands of cement on the market are about as reliable as human effort can make them. The materials which do need consideration, however, are sand and gravel. The one essential of sand is that it be free from loam, mica, clay, and organic matter. No sand should contain more than 3 per cent by weight of loam or clay or 1 per cent of mica. The quantity of loam or other fine impurities can be determined by shaking the sand up with water in a bottle, and allowing it to settle. The fine impurities will settle on the top and its proportional relation to the sand estimated. To determine whether the sand has much organic matter in it, a 12-ounce prescription bottle can be filled with sand to 4½ inches and then added to this should be added a 3 per cent solution of caustic soda until this solution and the sand fill seven ounces. The contents should be shaken well and allowed to stand for twenty-four hours. If the liquid which settles on top shows a dark color then the sand has too much organic matter in it, but if it is clear or slightly yellow it may be used without washing. The size of sand particles should be such that they will pass through a quarter-inch screen.

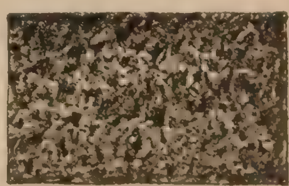
The usual size of aggregates should range from one-quarter inch to an inch and a half in diameter, and the various sizes should be so graded that they will make the most compact mass. The common run of bank gravel must be screened and washed. To make really good concrete that is water-tight, the grading of the aggregate is most important.

In fact, to determine the various quantities that should be used of the materials on hand, some method must be adopted to give the quantity of cement necessary to fill the voids in the sand and the quantity of cement and sand neces-

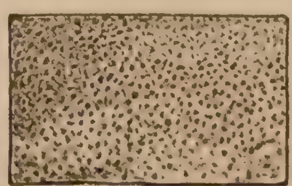
(*Continued on page* 156.)



Rough Cast Finish or Spatter Dash

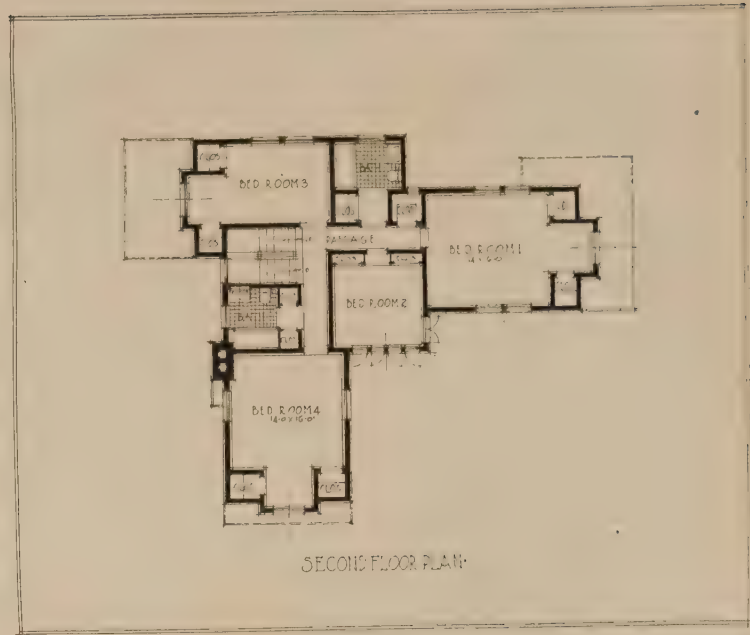


Finish made by the Tooler



Pebble Dash

Finish made by the Bush Hammer



HOUSE, DION W. KENNEDY, LARCHMONT GARDENS, N. Y.

C. C. Wendeback, Architect.

(*Continued from page* 154)

sary to fill the voids in the aggregate. A rather crude way of doing this is to employ water as the measure of the voids. Fill a pail with sand, and then pour water into it until the water, which is absorbed by the sand, comes to the same level as the sand. Note the quantity of water used up. If it represented 45 per cent of the volume of the sand, then it is known roughly that about 50 per cent of the volume of the sand ought to be the quantity of cement needed to fill in the voids of the sand. Thus one part of cement to two parts of sand. If now the gravel is measured in the same way and it is found that the voids show about 40 per cent of the volume of the aggregate, then assuming a little more than the water shows, about 50 per cent of sand and cement will be required to fill up these voids. That is, there should be just twice as much stone as there is cement and sand. We finally then arrive at the proportion for the concrete as follows: 1 part of cement to 2 parts of sand to 4 parts of gravel.

The amount of water which is added to make the mixture of concrete should not be too much. It should be of such a quantity that the mix is mushy but not watery, even when it is to be poured into forms.

Sidewalks and Porch Floors

It is generally recognized that one-course concrete sidewalks are the most successful when built by the average workman, for the slab is of one uniform body and not two layers, which might not have knitted together properly. For porch floors and walks three slabs should be 5 inches thick and laid on a good foundation. It is best to excavate 4 inches for the depth of the walk, tamp the gound, and pour water over it, to note whether it is absorbed or stays on top. If it is not readily drained off, it ought not to be used as the foundation of the walk, but should be excavated to a depth of 10 inches to 12 inches. In this excavation should then be tamped gravel or cinders, and some provision should be made by which any water that would seep through this gravel may be drained off. The timbers used for the forms along the edges of the walk may be 2 x 6's held in position with pegs. Slabs should then be determined for length. Usually they should not be in excess of 6 feet in any one direction and ¼-inch expansion joints should be placed in the walks every 25 feet. If alternate slabs are laid, the forms can be removed, so that the intermediate slabs can be poured between them. Of course, a partial bond will be developed between slabs in this way, but these joints will be the weakest point in the walk and if settlement takes place unequally and one slab breaks from the other the crack will develop at this joint and not appear on the face. The expansion joints should, however, be real separations, made with strips of asphaltic felt set between slabs. The usual mixture for concrete walks should be 1 part cement to 2 parts sand to 3 parts of gravel. The mixture should not have too much water in it, and when poured into the forms the top should be levelled off with a straight stick stretched across from one side of the form to the other. Too much trowelling should be avoided, since this is apt to draw excess water to the surface and also cement, which will show hair cracks when hardened. It is best not to use a metal trowel but a wooden one, so that a partial sandy surface is made. After the walk has been laid it should be protected from drying out too quickly by laying over it 4 inches of earth or two or three layers of burlap, which should be wet down about twice a day for a week. All walks and porch floors should have graded tops, so that water will run off of them. This is usually ¼ inch to the foot.

Sometimes porch floors give trouble from "dusting" and wearing away of the surface to a gritty and rough condition. This may have been caused by allowing the floor to dry too quickly or by having trowelled it too much and drawn cement to the surface. It may be remedied by using some one of the commercial floor hardeners or by painting the floor with water-glass solution or boiled linseed-oil. Water-glass solution should be diluted with 4 to 6 parts of water and applied with a brush in as many coats as the concrete will absorb. When boiled linseed-oil is used, it should be allowed to dry between coats, and as many coats should be added as the concrete will absorb. Both of these treatments will darken the floor, but the latter will darken it the most, and appears to be more effective.

Tennis-Court

In laying out any other platform construction of concrete, such as a tennis-court, the same principles of construction should be observed which were given above for sidewalks. However, more care should be taken with the drainage and foundation of the tennis-court. Not only should the 6-inch cinder or gravel bed be laid, but all around the outer edge of the court should be dug a trench about 18 inches wide and 3 feet deep. There should be laid at the bottom of this a drain-pipe, with open joints, sloping from the centre of one end of the court around both sides and joining together again at the middle of the other end and connected with another pipe to carry off the water of that drain-pipe to some lower level. The diameter of the drain-pipe should be about 5 inches and the slope 6 inches from its highest level to its lowest level. The upper surface of the court itself should slope across from one long side to the other with a pitch of 2 inches. The division lines of the slabs should follow as closely as possible the division lines of the tennis-court. The length of the concrete platform should be 21 feet greater at each end than the length of the court and the width 12 feet wider each side. This makes the entire concrete court 60 feet by 120 feet.

Concrete Driveway

Such driveways may lead to the garage or up to the porch of the house. One of the cheapest types to the garage is a double runway for the wheels of the automobile. These runways should be about 4 feet 8 inches on centres and made 18 inches wide. They should be constructed in the same way that walks are built.

Where a full-width concrete driveway is built, it should be made about 6 inches thick at the centre and 5 inches at the edges, sloping from the centre out. At intervals of every 25 feet expansion joints should be built as was specified for walks.

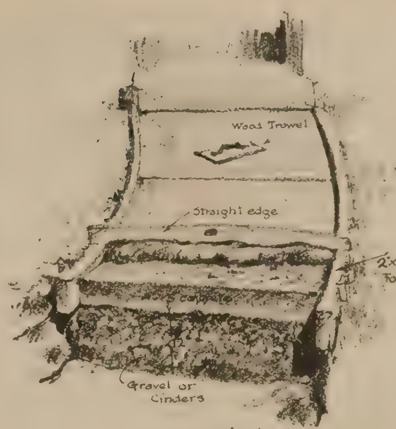
Concrete Steps

The only difficult problem in the construction of concrete steps is the making of forms. These should be well braced to prevent bulging when the concrete is tamped into them. The aggregate ought not to be over ¾ inch diameter, so that as the material is tamped into the forms and the sides spaded a good surface will be left when the forms are removed. If the aggregate is too large, some pieces may catch along the forms and when they are removed large holes will be found in the risers of the steps. The treads should be finished with a wood trowel.

Small Retaining Walls

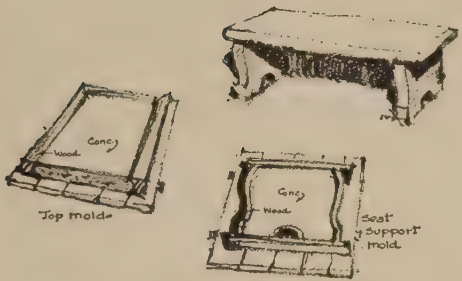
Wherever terraces or lawns need the support of a small retaining wall, concrete is excellent for this purpose. The foundations of such walls should be carried down below the frost-line. The usual mixture is 1 : 2 : 4. Drains should be built at intervals along the lower part of the wall to allow the seeping ground water to come out. At intervals of about

Concrete Runways to Garage

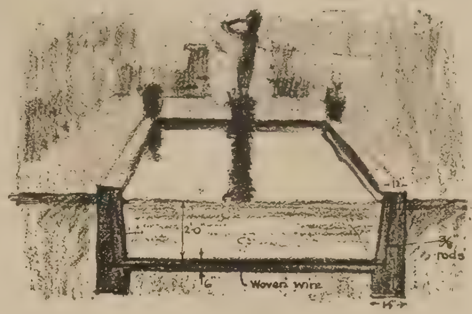


Concrete Sidewalk

Concrete Vase for Garden

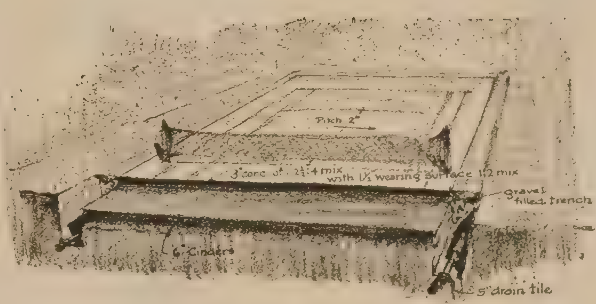


Simple Types of Concrete Garden Seats



Concrete Pool

Concrete Garden Retaining Wall



Concrete Tennis Court

every 25 feet expansion joints should be made, somewhat the shape of the tongue and groove in flooring. The base of such a retaining wall should be at least as wide as four-tenths the height of wall.

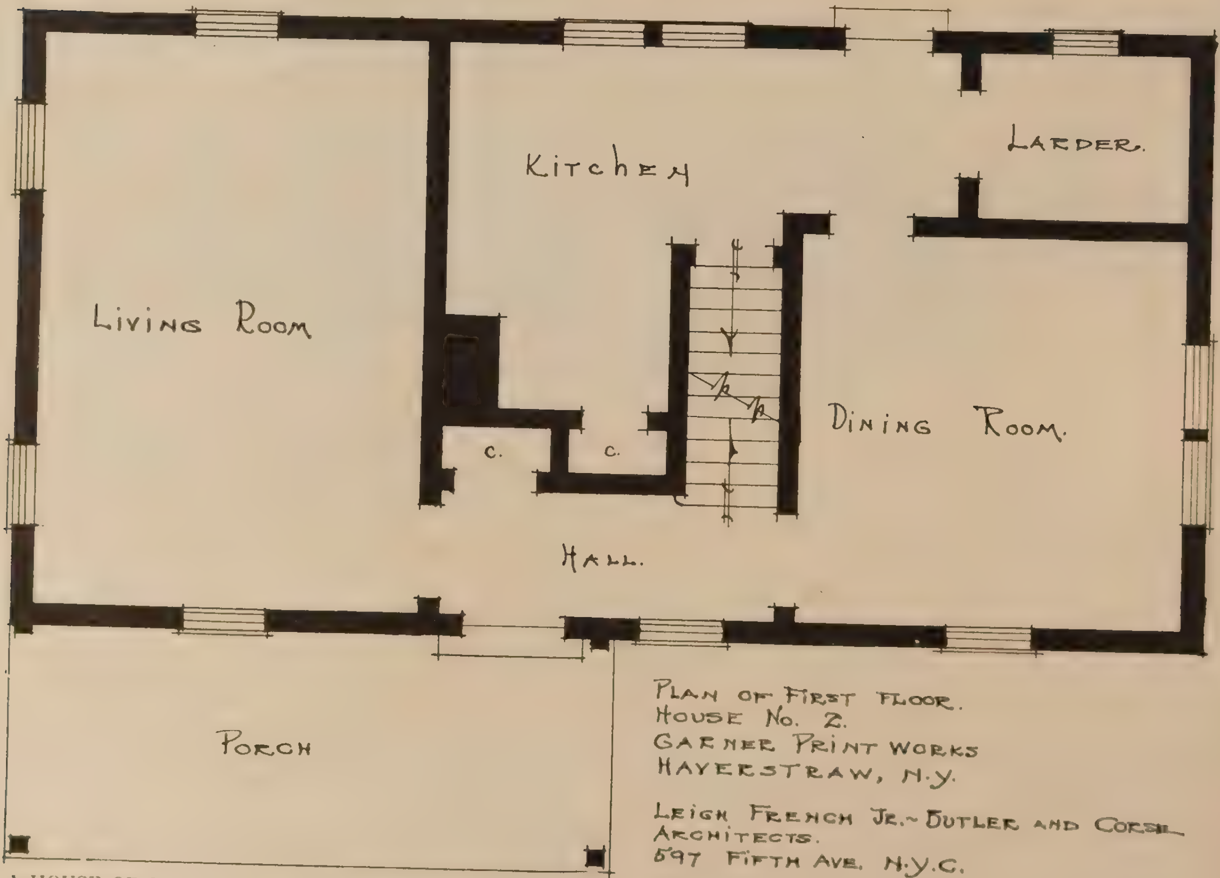
Pools and Fountain-Basins

Such ornaments to the garden are not entirely outside of the possibilities of the small house-owner's pocket-book. They should have the exterior walls carried down below frost-level, and the bottom and sides reinforced with steel. For the bottom woven-wire reinforcement will answer the purpose and for the sides ⅜-inch reinforcing rods should be used. These pools ought not to be more than about 2 feet deep, in which case the bottoms may be made 6 inches thick and the sides 12 inches at the top and 14 inches at the bottom.

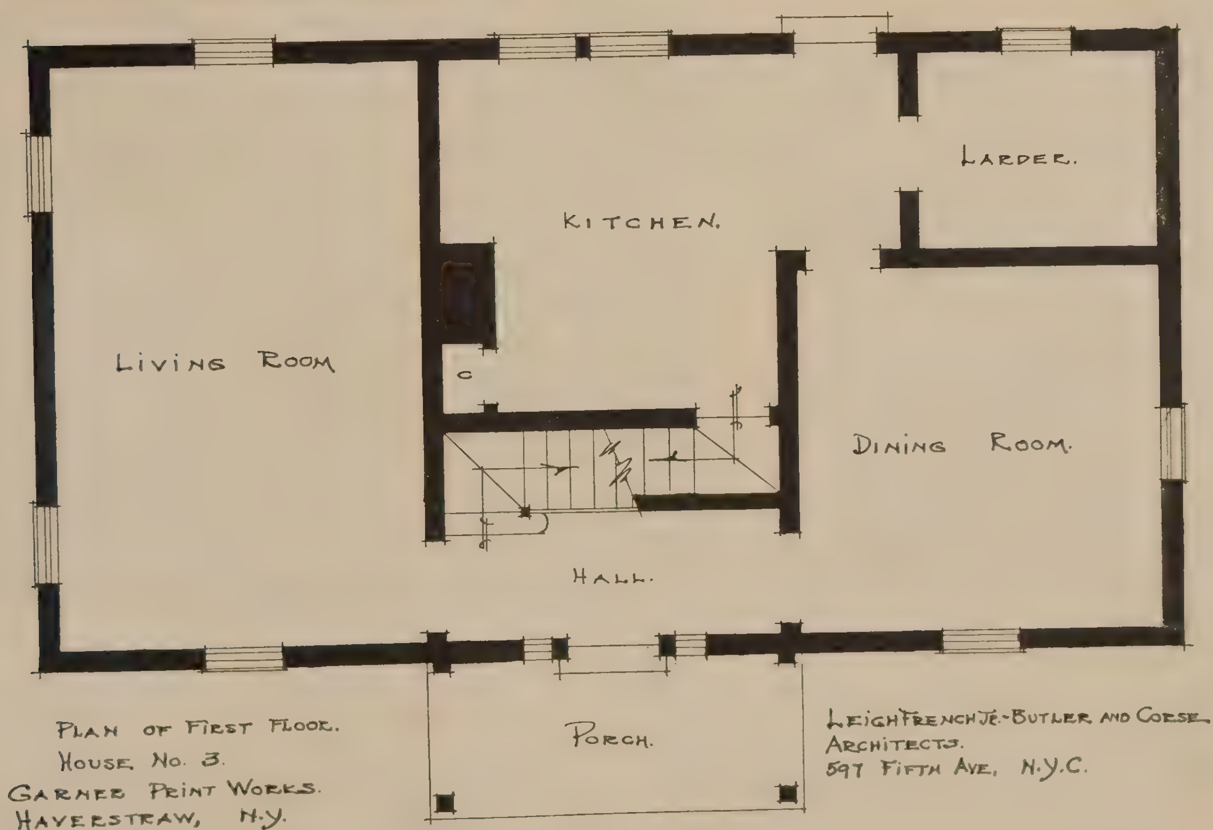
Ornamental Garden Furniture of Concrete

There is no great difficulty or secret in making simple garden furniture of concrete. Generally where the furniture is of simple lines, the mould can be made of wood. If, say, a bench is to be made, the top might be moulded as a slab of concrete, and the legs at the ends as slabs, and all fitted together. If flower-boxes are desired, the mould would necessarily have to be a little more complicated, but not greatly so. The one thing to remember in making any of these moulded bits of concrete is that they should always have embedded inside of them reinforcing wire lath.

Of course the making of ornamental pots and vases is rather difficult and takes some skill. Here the original shape must be modelled in clay, and a plaster mould made of it, which is shellacked inside and greased. Special cores must also be designed, and where fine surfaces are desired various processes of mixing ingredients must be resorted to. This is a special field of itself, and men who do this kind of work generally have studied out methods of their own. Some examples of this kind of work are illustrated.



A HOUSE OF SEVEN ROOMS AND ONE BATH.



A HOUSE OF SEVEN ROOMS AND ONE BATH.

E. A fountain of colored tile in middle of broad walk.
F. Simple iron-railing ground pool with pots of plants on the posts.

G. Winding paths bordered with boxwood and accented by fountains.
H. Circles of evergreen around orange-trees, with simple fountain in centre of gravel paths.

The Disposal of Sewage from the Isolated Country Estate

By William C. Tucker

THE disposal of sewage from the isolated country estate must be accomplished in a thoroughly scientific manner, in full accord with the laws of hygiene and sanitation and at low cost.

The theory is elementary in principle, simple in operation, and based upon bacterial reaction upon the fresh sewage, demanding a period of comparative quiescence, with a leisurely regular movement during its passage through the tanks to final disposal. During the period of rest, fermentation develops, which is greatly aided by the warmth of the sewage, breaking down the nitrogenous compounds into their component parts; the gases escaping to the air, the heavy insoluble portions settling to the bottom in the form of a thick viscous mass. The resulting effluent is nearly free of all solid matter and must be disposed of as quickly as possible before putrefaction may develop. The period for completing the cycle of the bacterial purification has been greatly shortened as a result of study and improvement in structural design.

The disposal of sewage through the means of the leaching cesspool, or any means of similar principle, must not be considered. Such methods are an abomination, a relict of barbarism, an offense against the sense of sight and smell, and a constant menace to health. Primitive methods or those lacking in absolute scientific security must not be allowed. Cesspools found upon the property must be abandoned, their contents removed and hygienically destroyed, and the sides and bottom of the excavation thoroughly powdered with chloride of lime and left exposed to the sunlight and air for three or four days, after which it must be filled with clean dry material containing no matter which may produce decomposition.

Sewage is water containing household wastes in suspension or solution, and consists of the refuse from the kitchen, fouled water from the laundry and bathroom and that from cleaning.

A sewage-disposal system of simple design and construction, shown in Fig. 1, consists of three elements—the septic tanks, the series of pipe sewers with branches to the different buildings, and the disposal field. All these must co-ordinate, and when scientifically designed and well constructed will function in a natural, orderly manner. A disposal system, be it small or large, will demand careful and thorough study. At the inception of the work, a topographical survey of the property of approximate accuracy must be made along the lines of the proposed sewers, and in the vicinity of the tentative position of the septic tanks and disposal field, upon which must be indicated all prominent features of interest. From this a definite scheme may be evolved, and satisfactory positions for the different elements selected, which must avoid rock indications, healthy large trees, attractive groups of shrubbery, streams, and brooks, which will greatly reduce cost of installation. All data relating to the project must be accurate, deductions and conclusions concise and explicit, tempered with good judgment and experience.

The sewage-disposal system should be placed at some point rather remote from habitation. The disposal field must be located so that there may not be the slightest fear or apprehension concerning the permanent security of the source of the water-supply, which must be kept absolutely free from remote possibility of pollution.

The controlling factor which determines the general design and size of a disposal system is the water consumption for domestic purposes upon the estate, which, for purposes of computation from observation, may be assumed at a maximum of one hundred gallons per capita per day, depending upon the character and size of the establishment, its social position, and amount of entertaining enjoyed.

Sewer Lines

The lines of sewers to the septic tanks must be true to line and grade between certain predetermined points, which will be suggested from a study of the topographical survey. There must not be any curves nor bends. The sewers should be laid at least three feet deep to prevent freezing in very cold weather, particularly where of necessity the lines may be laid with slight fall, producing sluggish flow. The pipe may be either iron or tile—the former is more desirable on account of its strength, and the length of each piece five feet, necessitating fewer joints, but its cost makes it prohibitive for general use. Tile-pipe must be hub and spigot, salt-glazed, vitrified earthenware, sound, truly cylindrical, and straight and free from blister, check, or other defects, and must be carefully tested upon bank before use.

The pipe should be laid up-hill with hubs uppermost. The joints must be carefully made, particularly should wet or insecure ground be encountered, to provide against the possibility of seepage entering the pipe, either during or after construction. The pipe must be thoroughly cleaned before laying and kept so during the work, and open end closed water-tight with wooden plug and gunny sack before leaving the work for the day. The correct method of pipe-laying is most simple: a length is laid hub up-hill, into which is inserted the spigot of the next, carefully centred. About the annular space between the outside of spigot and inside of hub is calked a ring of picked oakum filling one-third of the depth of the joint, the remainder of the space being filled with stiff, strong Portland cement, well worked with tool and gloved hand, and joint left true and neat and tapering. Before laying another pipe, the inside of the joint of that already laid should be carefully cleaned with long-handled swab to the end of which is securely attached a gunny sack, to remove any cement which might be forced into the pipe when the joint was made. After joints have thoroughly set, a wedge of soft earth should be carefully packed under each pipe at centre to hold them firmly in space, and trench refilled in six-inch layers, for the first two feet, care being taken not to disturb work already laid. Trench should be refilled evenly and well tamped with tool or puddling and left well mounded. No work should be left exposed overnight for fear of injury from loosened falling material from sides of trench. Joints of pipe in proximity to trees should be coated outside with hot tar to prevent root tendrils forcing their entrance, forming an ever-increasing wad, finally causing complete stoppage.

The trenches for the sewers should be carefully excavated, the material thrown on one side, leaving the other free for the work. They should be cut true and straight with slightly sloping sides when in firm soil, and braced where water or unsafe material may be encountered. The bottom should be six inches wider than the over-all dimension of sewer at hub and should be most carefully cut true to established grade of work, so that pipe-laying may proceed rapidly and without interruption and that joints may

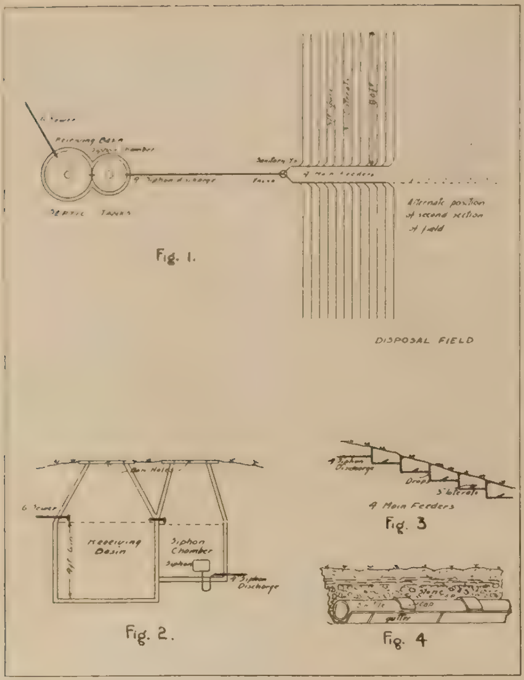
(*Continued on page* 164)

POOL WITH WATER-LILIES IN LOWER GARDEN, ESTATE H. W. CROFT, GREENWICH, CONN.
Mrs. Ellen M. Shipman, Landscape Architect.

POOL IN LOWER GARDEN, ESTATE MRS. WILLARD D. STRAIGHT, ROSLYN, LONG ISLAND.
Beatrice Jones Farrand, Landscape Architect.

POND FROM STEPS OF GARDEN, ESTATE GEORGE D. BARRON, RYE, N. Y. Charles Wellford Leavitt, Landscape Engineer.

POND ACROSS THE LAWN FROM HOUSE, ESTATE MRS. MOSES TAYLOR PYNE, PRINCETON, N. J.
Daniel W. Langton, Architect.



(*Continued from page* 161)

be made in a thorough manner. Excavation for the trench work may be started at several points, to gain time, and should be run up-hill so that drainage always may be free and not impede the progress of the work.

The Septic Tanks

The septic or settling tanks shown in Fig. 2 are chambers into which the sewers empty and in which bacterial reaction develops. They are built of water-tight masonry to withstand pressure from without as well as from within, and are generally placed adjoining each other for economy of construction, and have inner surface of Portland cement brush smooth. These basins, if scientifically designed and well constructed, will function automatically in a continuous and normal manner, requiring little or no fixed attention but periodic inspection. The first or receiving basin should have a capacity for one day's sewer discharge, which may demand dimensions at variance with economical construction, in which case a supplemental tank may be added.

From the receiving-basin the effluent flows into the siphon chamber, as shown in Fig. 2, of smaller size, in which sedimentation continues, and in which is built a siphon which automatically discharges the entire contents of the chamber at one flush when it may have reached a determined height.

Stall drainage and waste water from the carriage-wash should not enter the disposal system. The finely masticated food of the farm animals does not settle out in the septic tanks, but is carried in suspension, causing stoppage in the laterals at the disposal field. The silt from the carriage-wash settles in the bottom of tanks, interfering with the bacterial reaction, and finally has to be removed.

The Disposal Field

The effluent from the septic tanks, having undergone complete bacterial change, is now in a safe condition for final disposal. This operation is based upon physiological laws, and resembles closely similar action within the human lungs. At the disposal field, it is led into lateral lines of pipes of small size, shown in Fig. 4, which are surrounded by a non-absorbent media, into which it slowly exudes. This media consists of one-inch broken stone which completely surrounds the pipe for a distance of four inches. In the interstices of this media is stored oxygen which attacks the effluent with great energy, liberating nitrogen which is most greedily devoured by the growing vegetation at the surface of the ground through its root tendrils, and oxygen which is retained for a continuation of the cycle of operation. The clarified fluid is readily absorbed by the surrounding earth lying beyond the stone media.

From the septic tanks the effluent is led to the disposal field through four-inch-main feeders of vitrified tile-pipe with cement joints, shown in Fig. 1, at which point are inserted, right and left, sanitary Y's at intervals of three feet, with three-inch outlets, the inverts of which are at the same level as that of the body of the pipe. The grade of these mains must be such that the flush from the siphon is not allowed to rush with great velocity to the end of the line, but held in check so that each lateral may be completely filled. Should this be impossible on account of the slope of the surface of the ground, without extending the pipe-lines to a depth contrary to good practice, "steps" or "drops" may be employed, as shown in Fig. 3, which may be obtained at any pipe-yard, and are made with such "drop" as the work demands.

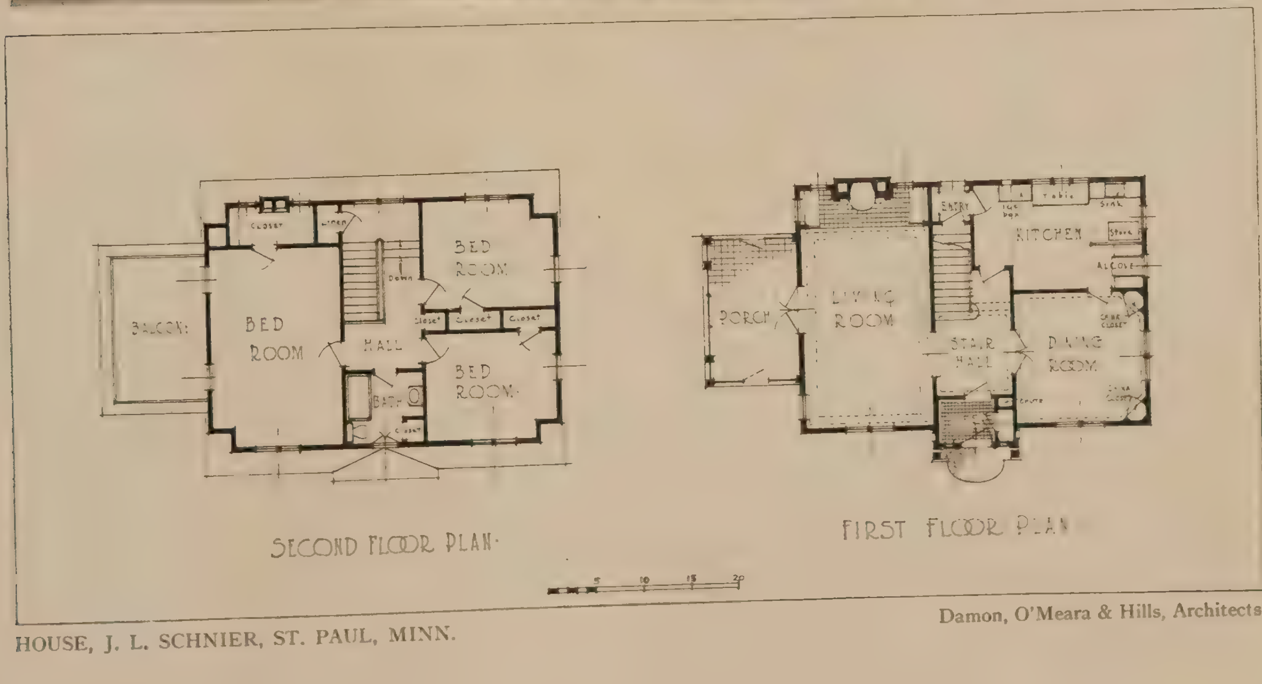
A typical disposal field is well illustrated in Fig. 1. For economy of operation it should be separated into two or more sections of equal size, dependent upon the size of the project, which are controlled by a diverting valve, and which are used alternately so that one section may be at rest while the other may be in service, which method of functioning has become general from observation. The period of activity of a section should be limited to two weeks. The position of the sections will be largely governed by conditions at the site, but it will generally be found advisable for ease of inspection and relocation that they be placed either directly opposite to or adjoining each other as shown.

The surface of the disposal field should consist of a firm rich top-soil for the encouragement of the growth of hardy grasses. The subsoil should be coarse sand or gravel free from loam. The field should have a gentle slope so that drainage may be free. The drainage of the subsoil must be excellent; where this is not so, underdrainage will have to be provided.

The disposal field under no circumstances should be cultivated for garden or other purposes, nor should trucking across this area be permitted, for fear of injury to the small subsurface pipe-lines.

From the three-inch branches of the main feeders are extended lateral lines as shown. These are a most important feature of the disposal system and largely determine its efficiency. The bacterial action upon the sewage in the septic tanks is of vital importance, but it is largely physiologic, while the demanded high efficiency of the laterals is almost entirely dependent upon mechanical skill. These lines consist of three-inch drainage-tile in one-foot lengths, laid upon gutters, with open joints protected and kept free from clogging by the loose trench material, by loosely fitting caps, as well shown in Fig. 4. Tiles, gutters, and caps are all of the same material—hard-burnt, unglazed earthenware. The laterals are laid in shallow trenches, ten inches deep and one foot wide at bottom, which are carefully dug true to line and grade. The operation of running the lines is simple; the gutters are laid first, carefully, upon which are placed the tile, caps covering the joints, about which is then placed four inches of one-inch broken stone, free from dust and

screenings, completely surrounding the work, care being taken not to disturb the work already in place. Over the broken stone is spread a thick layer of salt hay to prevent trench material filling the interstices of the stone. The lines should not extend over eighty feet in length, and must be laid quite flat, not over four inches per hundred feet, so that each siphon flush completely fills the lines, from which it slowly exudes through the open joints.



Damon, O'Meara & Hills, Architects.

HOUSE, J. L. SCHNIER, ST. PAUL, MINN.

Book Reviews

A HISTORY OF FRENCH ARCHITECTURE, FROM THE DEATH OF MAZARIN TILL THE DEATH OF LOUIS XV, 1661–1774. By Sir Reginald Blomfield, R.A., Litt.D., M.A., F.S.A., Honorable Fellow of Exeter College, Oxford; Officier de l'Ordre de la Couronne, and Officier de l'Ordre de Leopold II of Belgium; Officier de l'Instruction Publique, and Honorable Corresponding Member of the Société des Architectes Diplômes de France. Author of "A History of French Architecture, 1494–1661," with Drawings by the Author and Other Illustrations. Charles Scribner's Sons, New York.

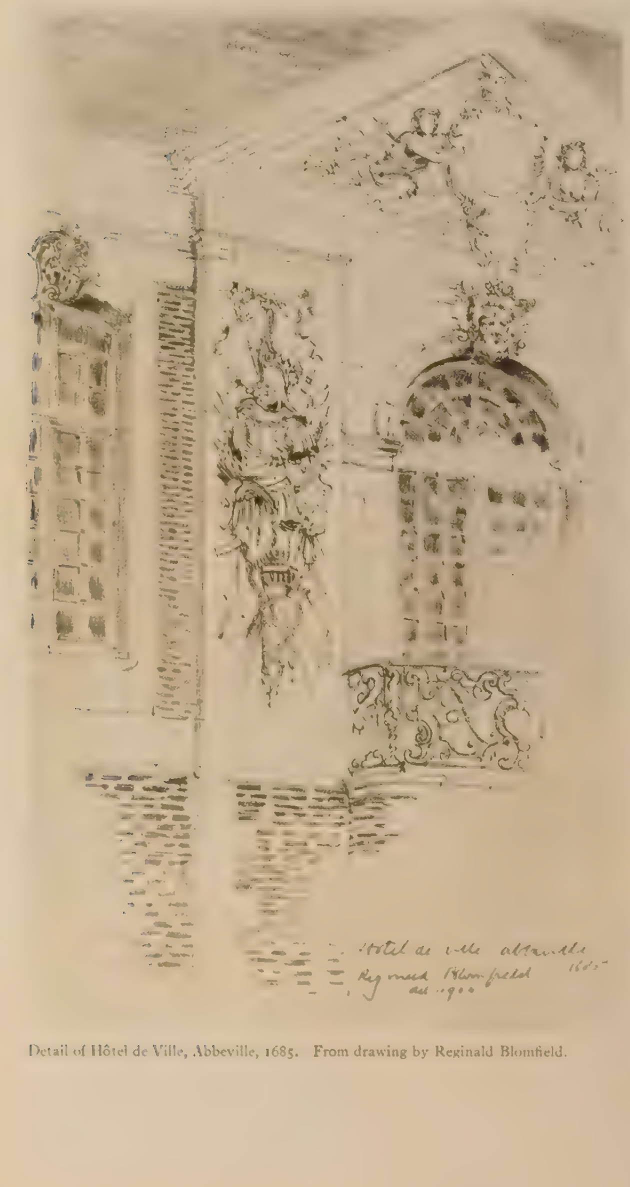
Louis XIV, Colbert, and the Academies, The Academy of Architecture, The French Academy at Rome, The Royal Building Staff, Louis le Vau, François d'Orbay, Richer, Lambert, and the Last of the Old Régime, The Completion of the Louvre, Bernini and Claude Perrault. Claude Perrault, François Blondel, Errard, Mignard, La Valfenière, and Le Pautre, Cottart, Richer, Robelin, De Lisle, Leve, Girard, Gobert, Leduc, Gittard, Bruant, Bullet.

The draftsmen: Jean Marot, Daniel Marot, Jean le Pautre, Pierre le Pautre, Le Blond, Berain, Le Clerc, Israël Silvestre, and Adam Perelle.

Andre le Notre, Jules Hardouin Mansart.

The Architecture of the Reign of Louis XIV, Daviler and Desgodetz, Mansart's Staff: L'Assurance, Le Roux, and Audry, Robert de Cotte, Jacques Jules Gabriel, De La Maire, Aubert, Courtonne, Cartaud, Oppenord, Meissonier, the Cuvilies, Le Blond, Boffrand, Servandoni, Here, Ange Jacques Gabriel, Soufflot and Constant D'Ivry, Blondel, Patte, Mique, French Architecture in the Reign of Louis XV, Civic Architecture in the Reigns of Louis XIV and Louis XV, The End of a Great Tradition.

"In these two volumes I have endeavored to complete my account of French architecture of the old régime ('A History of French Architecture, 1494–1661'), taking up its history from the death of Mazarin, the date of the real beginning of the reign of Louis XIV, and carrying it down to the end of the reign of Louis XV. At that date the old tradition was rapidly breaking up. The revival of the antique prepared the way for the revivalists who have reduced the art of architecture to a game of battledore and shuttlecock. I make no apology for closing my study of French architecture at the date 1774."



Detail of Hôtel de Ville, Abbeville, 1685. From drawing by Reginald Blomfield.

Those who have read the author's earlier volumes need not be told that he is a man of convictions, with a keen sense for summing up not only what he thinks the outstanding features of the architecture of the time, but as well with a lively appreciation of personalities and historic backgrounds.

When Mazarin died and Louis became king, the latter was but twenty-two years old, "ignorant and uneducated, but with a highly developed ego and an intelligence that needed only development." His ambitions were limitless, and his pride in himself was identical with his pride in France. He was on the forefront of everything.

To Louis and his great minister Colbert we owe the foundations of the unrivalled glory in the arts that we associate with France of the seventeenth and eighteenth centuries. Under Colbert were founded the Academy of Architecture and the French Academy at Rome, and the influence of these institutions governed the work and careers of practically every one concerned in the architecture of the time.

The Academy of Painting and Sculpture was founded in 1648, a close corporation conducted somewhat on modern trades-union ideas. In 1663 Le Brun, dictator of the arts for many years, obtained a royal decree that no painter or sculptor was entitled to call himself painter or sculptor to the king unless he were a member of the Academy. The Academy was a powerful influence for the betterment of French arts, but like all academies it had its enemies, both without and within. As the author well says: "Academies are very much open to attack." This is as true of our day as of the days of Louis.

The Academy of Architecture grew out of Colbert's appointment as "Surintenant des Bâtiments." He already had in mind the completion of the Louvre and "beaucoup de monuments à la gloire du roi, comme des arcs de triomphe, des obélisques, des pyramides, des mausolées, car il n'y a rien de grand ni de magnifique qu'il ne se proposat d'exécuter."

In 1686 the Academy declared that "les mêmes sentiments que l'on a toujours eus qu'il y a trois choses nécessaires à observer dans les bâtiments, qui est la solidité, la commodité et la beauté, et que la perfection de ces trois parties depend de la grandeur du génie de l'architecte." And with great wisdom they added that there were no rules infallible.

The French Academy at Rome began under the direction of Charles Errard and made a brilliant start. Its troubles came with lack of money and the jealousy and intrigues of those near the king. Chief among these was Jules Hardouin Mansart, whose extraordinary success in his career was due to "his relentless pursuit of his own interests."

The author again and again refers to Mansart, and his characterization of him in a special chapter makes interesting reading, with the savor of spicy personality.

Like so many other observers of art these days, the author is inclined to be rather pessimistic. He blames conditions on the tendency toward specialization in science.

"Serious Art turns no votes, and the authorities content themselves with half-hearted experiments which leave matters where they were, and waste the money of the taxpayer. At our public schools and universities the Arts are barely considered as a side issue, and they have in recent years been thrust still farther into the background by the overpowering claims—one might even say the insistent self-assertion—of specialized science. It is this dreary specialization that has obliterated the humanism of earlier generations, and made people forget that the graphic and plastic Arts are, in their way, the expression of human emotion and imagination not less than music and literature."

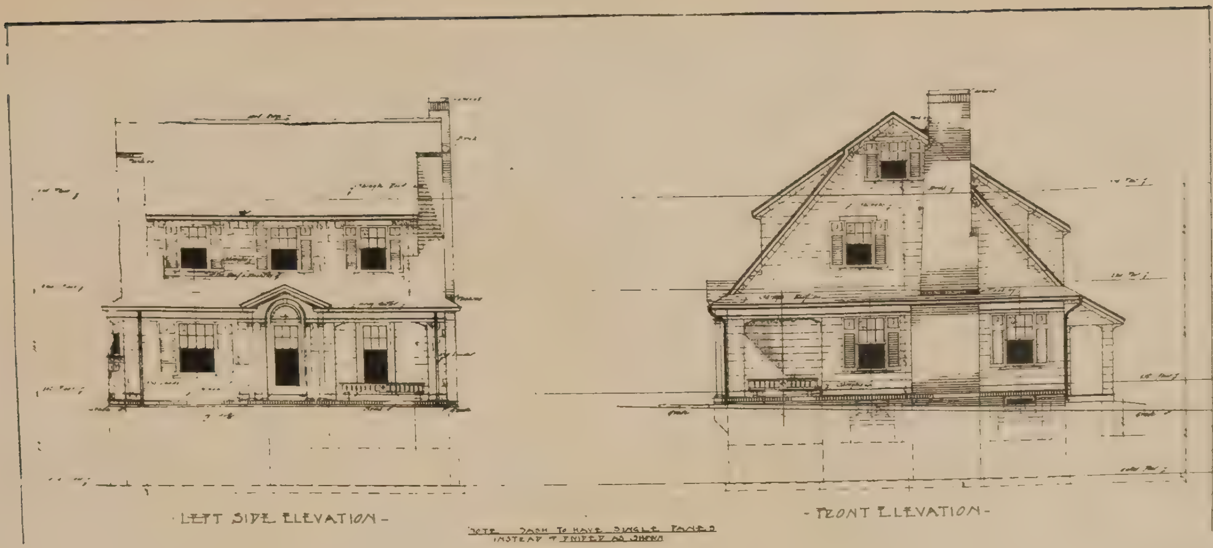
The illustrations are profuse and include contemporary work engraved by famous French engravers as well as many admirable drawings by the author.

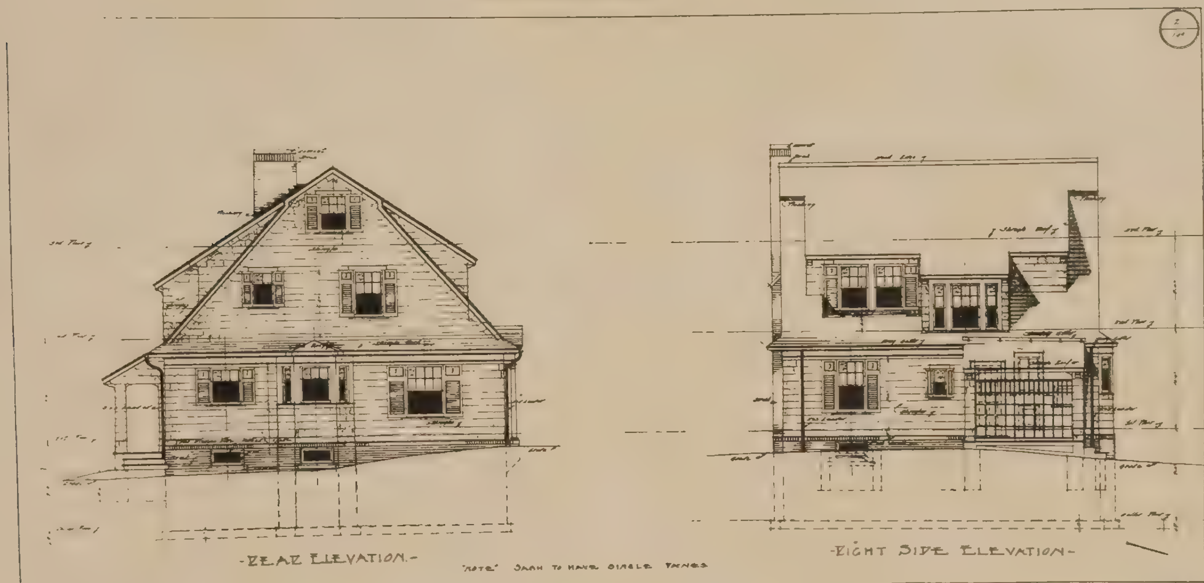
YEAR BOOK NEW YORK SOCIETY OF ARCHITECTS, 1922. Eleventh Edition. Published by The New York Society of Architects, 29 West 39th Street, New York. 8vo. Bound in leather.

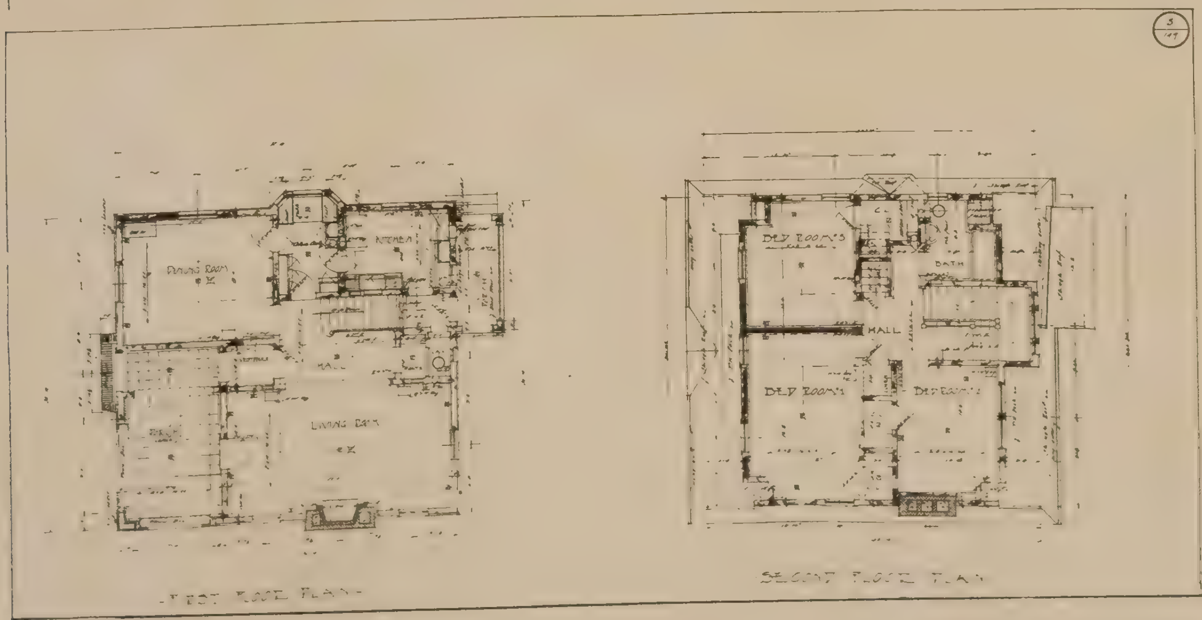
Contents: Advisory Board on Public Buildings, Monuments and Memorials; Architects in New York City, Manhattan and Bronx; Archit cts in Brooklyn; Architects in Queens by Post-Office Address, Architects Long Island outside of Queens, Architects in Richmond, Architects in New York State, Architects (Members) in other States, Board of Appeals, Board of Standards and Appeals, Board of Standards and Appeals Rules, Building Code, New York City; Building Zone Resolution, Classified Index of Building Trades, Code of Ethics, New York Society of Architects, Code of Professional Practice, New York Society of Architects, Committees, New York Society of Architects, Mailing Chute Regulations, Mechanics' Lien Law, Officers, New York Society of Architects, Plumbing Drainage Rules and Regulations, Registration of Architects (Law for), Signs and Show Bills, Code of Ordinances, State Industrial Laws Relating to Buildings, Tenement House Law.

In presenting herewith its "Code of Ethics" and "Professional Practice and Schedule of Reasonable Charges" for the use of its members, this society hopes that these codes will favorably influence the personal or professional intercourse between the members of the great architectural family and its allies and clients.

This book is of value as a reference to all concerned with the practice of architecture and building.







HOUSE, MRS. EVA H. BREWSTER, SYRACUSE, N. Y.

Webster C. Moulton, Architect.

Concrete Construction

By DeWitt Clinton Pond, M.A.

THIRTEENTH ARTICLE

IN the twelfth article the design of a flat slab for a panel measuring 19 feet, 9 inches by 21 feet, 9½ inches was developed. A diagrammatic layout of such a panel is shown in Fig. XII and an actual steel layout is shown in Fig. XIII. This last type of drawing must be filed with the structural drawings when application is made for a building permit from the Bureaus of Buildings in New York. The method used in making such a drawing and the details which must be considered will be discussed later.

As a comparison of the two-way and the four-way systems is to be made, it will be necessary to determine

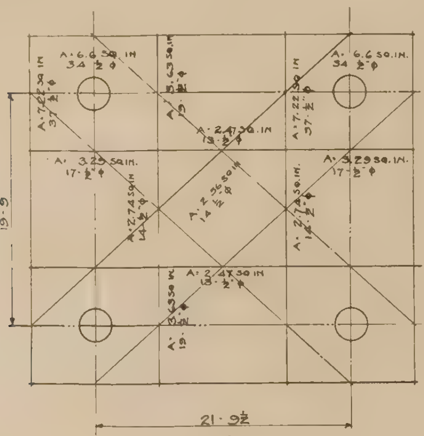


FIGURE 12

the areas of steel required in the bands and suspended panel if the slab were designed for two-way reinforcement.

By referring to previous articles it will be noted that there is no difference in the formulas for the design of steel in the column-head and mid-sections in either two-way or four-way systems. The negative moments are the same in either case. This is not true of the formula for finding the positive moment in the outer section nor for the positive moment in the inner section.

The positive moments in the outer sections are given by the formula $M = \frac{1}{80} WL$.

$$M = \tfrac{1}{80} \times 141{,}000 \times 19.75 \times 12 = 417{,}800$$

$$M = \tfrac{1}{80} \times 141{,}000 \times 21.8 \times 12 = 461{,}100$$

$$A_{s_1} = \frac{417{,}800 \times 8}{7 \times 16{,}000 \times 7.25} = 4.1 \text{ square inches.}$$

$$A_{s_2} = \frac{461{,}100 \times 8}{7 \times 16{,}000 \times 7.25} = 4.53 \text{ square inches.}$$

The positive moment in the inner section is determined by the formula:

$$M = \tfrac{1}{133} WL$$

$$M = \tfrac{1}{133} \times 141{,}000 \times 19.75 \times 12 = 251{,}200$$

$$M = \tfrac{1}{133} \times 141{,}000 \times 21.8 \times 12 = 277{,}300$$

$$A_{s_1} = \frac{251{,}200 \times 8}{7 \times 16{,}000 \times 7.25} = 2.46 \text{ square inches.}$$

$$A_{s_2} = \frac{277{,}300 \times 8}{7 \times 16{,}000 \times 7.25} = 2.72 \text{ square inches.}$$

By observing the results found above and in Article Twelve giving the areas of steel and also noting the number of bars required, the following figures may be compared. The calculations based upon the formulas for the four-way system result in areas given below.

- Direct bands—long dimension—3.63 square inches, 19 ½-inch round rods.
- Direct bands—short dimension—3.29 square inches, 17 ½-inch round rods.
- Diagonal bands—2.56 square inches, 14 ½-inch round rods.
- Across direct bands—long dimension—2.74 square inches, 14 ½-inch round rods.
- Across direct bands—short dimension—2.47 square inches, 13 ½-inch round rods.

The calculations based upon the formulas for the two-way system result in the following areas.

- Direct bands—long dimension—4.53 square inches, 24 ½-inch round rods.
- Direct bands—short dimension—4.1 square inches, 21 ½-inch round rods.
- Slab steel—long dimension—2.72 square inches, 14 ½-inch round rods.
- Slab steel—short dimension—2.46 square inches, 14 ½-inch round rods.
- Across direct bands—long dimension—2.74 square inches, 14 ½-inch round rods.
- Across direct bands—short dimension—2.47 square inches, 13 ½-inch round rods.

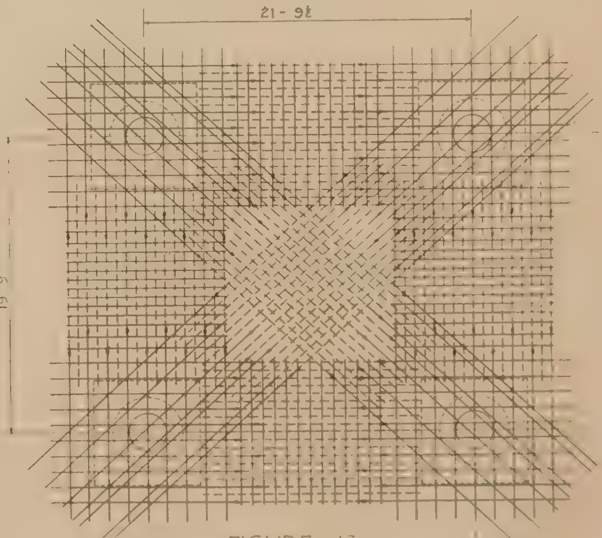


FIGURE 13

These areas are shown in Fig. XII and in Fig. XIV, and the areas required at the column-head sections are also shown. In the case of the four-way system the areas of steel required at the column-head section are such that only one-half the steel in the bands must be bent up. According to the code the point of contraflexure must be considered as being located at three-tenths of the distance, centre to

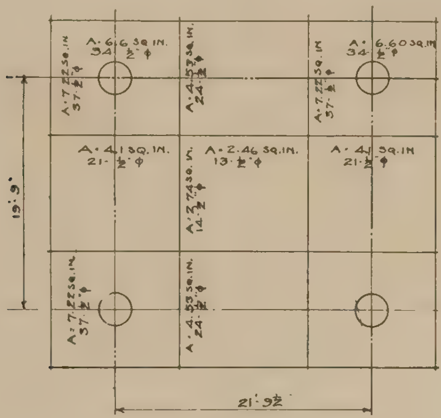


FIGURE 14

centre, of columns for slabs with drops, and at one-fourth this distance for slabs without drops. In the present case the three-tenths point will be used.

In the two-way system there are so many bars required in the direct bands that not all need to be turned up. If 18 are bent up from one band and 19 from the adjacent one there will be enough steel over each column. The remaining bars may be only long enough to develop a proper bond stress.

The steel layouts show how this steel is placed and from such a drawing it is possible to estimate the weight of steel in each panel. In order to make such a drawing it is necessary to know the requirements as to the lengths of the bars in the panel. Such requirements are stated in Section *B* of Rule 9 in the Amendment. This rule is given below:

"Splices in bars may be made wherever convenient but preferably at points of minimum stress. The length of any splice shall be not less than eighty (80) bar diameters and in no case less than two (2) feet. The splicing of adjacent bars shall be avoided as far as possible. Slab bars which are lapped over the column, the sectional area of both being included in the calculation for negative moment, shall extend to the lines of inflection beyond the column centre."

Section *C* also bears upon this subject:

"When the reinforcement is arranged in bands, at least fifty (50) per cent of the bars in any band shall be of a length not less than the distance centre to centre of columns measured rectangularly and diagonally; no bars used as positive reinforcement shall be of a length less than half ($\frac{1}{2}$) the panel length plus forty (40) bar diameters for cross bands, or less than seven-tenths ($\frac{7}{10}$) of the panel length plus forty (40) bar diameters for diagonal bands and no bars used as negative reinforcement shall be of a length less than half ($\frac{1}{2}$) the panel length. All reinforcement framing perpendicular to the wall in exterior panels shall extend to the outer edge of the panel and shall be hooked or otherwise anchored."

Section *D* of this rule simply states that "adequate means shall be provided for properly maintaining all slab reinforcement in the position assumed by the computations.

In the four-way system, shown in Fig. XIII, one-half the band steel is bent up and carried to the point of inflection in the adjacent band. The length of the bent-up steel must be estimated as well as the length of the straight bars. It might be noted that in this design the steel is bent up in the same manner as in the two-way system. In some offices it is the practice to "drape" the steel and to have it run through, splicing only where necessary. In this case all the steel would be bent up, but many engineers do not believe that this is good practice. In the two-way system about half the steel is bent up, also. It will be noted that the figures show only the steel required for one panel and does not show the steel bent up from the adjacent panels. As both figures are alike in this arrangement a comparison of the two will be a proper one. When such a steel layout is to be submitted to the Bureau of Buildings, however, all the steel must be shown, and, as will be explained later, the adjacent panels must be included in the drawing.

In order to determine the weights of steel in each panel it is necessary to determine the number of bars, their lengths and diameters. In the present case all bars are made $\frac{1}{2}$ inch round in order to make comparison easy, but under ordinary circumstances $\frac{5}{8}$-inch rounds are often used and in the two-way systems $\frac{3}{4}$-inch bars are used in the direct bonds.

By estimating the weight of steel in each panel it will be found that there are 1,332 pounds in the two-way panel, and 1,365 pounds in the four-way panel. It can be seen that there is a slight saving on steel in favor of the two-way system, as far as these panels are concerned.

Although this design has been developed for the purpose of comparing the two types of reinforcing and the steel layouts were made for this purpose, these may be used as examples of the type of drawing which must be used as one of the drawings submitted for approval of the building department. The drawings submitted must show, however, not only the steel in a typical interior panel, but also the reinforcement in a typical exterior panel as well. There should also be submitted a section showing a typical column head, drop, and the position of the steel in the slab.

In order to complete the design it may be well to check the shear at the edge of the column capital and at the edge of the drop.

The area of the panel is $21.8 \times 19.75 = 430$ square

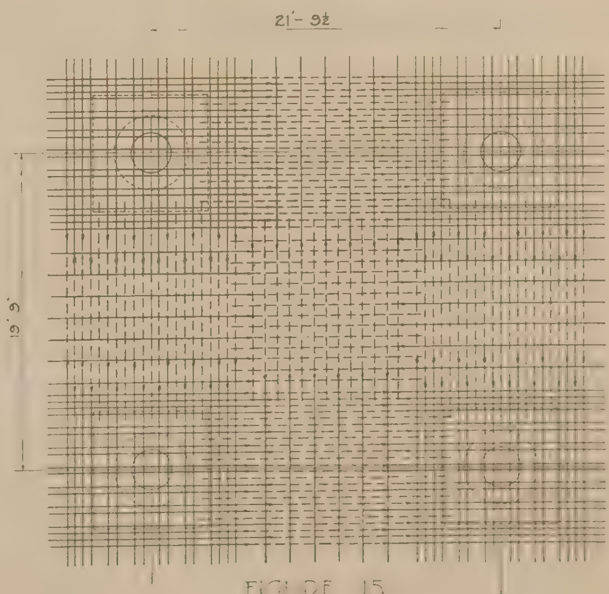


FIGURE 15

feet. The area of the drop is 49 square feet, and the area of the column capital is 17.1 square feet.

The weight which will cause the tendency toward shearing at the edge of the drop can be found by subtracting the area of the drop from the area of the panel and multiplying the remaining area by 322 pounds—the unit weight found in the last article.

$$(430 - 49) \times 322 = 122{,}700 \text{ pounds.}$$

As has been stated in previous articles the shear at the edge of the drop is determined on the bjd section around the perimeter, or, in other words, the area of concrete which will be considered as resisting shear is found by multiplying the distance around the perimeter of the drop by $\frac{7}{8}$ of the effective depth at that point. The distance around the perimeter is $4 \times 84 = 336$ inches, which is the value of b in the formula. jd will equal $\frac{7}{8} \times 6.5 = 5.7$ and bjd will be found to be 1,915 square inches. Dividing this into 122,700 pounds the result will be 64 pounds shear. The allowable shear is given in the code as 60 pounds, so the drop must be increased in size. It will be found that if the drop measures 7 feet 2 inches it will be large enough. It might be noted that in the two-way system the depth will be greater than given above as there are only two layers of steel instead of four. In this case the original dimensions of the drop would be correct.

The weight which will tend to produce shearing at the edge of the column capital can be found in the same manner as that which caused a tendency toward shearing at the edge of the drop. It must be borne in mind that the area of the column capital is 17.1 square feet.

$$(430 - 17.1) \times 322 = 133{,}000 \text{ pounds.}$$

In the present case the bd section is used, and as the diameter of the capital is 4 feet 8 inches the b dimension will be 175.9 inches. The d dimension will be 10.75 as determined in the last article. bd will equal 1,881 square inches and the unit shear is 77 pounds. The allowable shear at this point is 120 pounds per square inch, so the drop thickness and column cap diameter are correct.

The calculations given above have involved the application of parts of nearly all the rules dealing with flat-slab construction, excepting those dealing with column design. However, the conditions found in the design of an exterior panel have not been referred to and as these are important, section c of Rule 12 will be given below.

"The negative moments at the first interior row of columns and the positive moments at the centre of the exterior panels on moment sections parallel to the wall shall be increased twenty (20) per cent over those specified above for interior panels. The negative moment on moment sections at the wall and parallel thereto shall be determined by the conditions of restraint, but the negative moment on the mid section shall never be considered less than fifty (50) per cent and the negative moment on the column-head section never less than eighty (80) per cent of the corresponding moment at the first interior row of columns."

As has been stated, the drawing showing the steel layout which is submitted to the Bureau of Buildings must show a typical exterior as well as a typical interior panel. This drawing must show that there is 20 per cent more steel over the first interior columns than over the typical interior ones. It must also show that the steel in the direct band, spanning from the first interior column to the exterior column, and, in a four-way system, the diagonal band for the same span have areas 20 per cent greater than the corresponding areas in interior panels. The negative moments at the wall will have to be at least 80 per cent as great as over the first interior bands and columns. The wall-bands are only half as wide as the typical band and only require one-half as much steel except at the corners of the building, where the same increase is made as in the exterior panels and over the first interior columns.

The last three articles have dealt with the requirements of the New York Building Code with regard to flat-slab construction. The next article will deal with the application of these requirements to the design of a section of a typical floor in the 395 Hudson Street Building. This should be in the nature of a review of all the rules given in these articles.

A Joint-Ownership Apartment-House in Baltimore, Maryland

Roy G. Pratt, Architect

THIS apartment-house will be known as "Number Three Somerset Road," and will be built in the northern section of Baltimore, Md., known as "Roland Park."

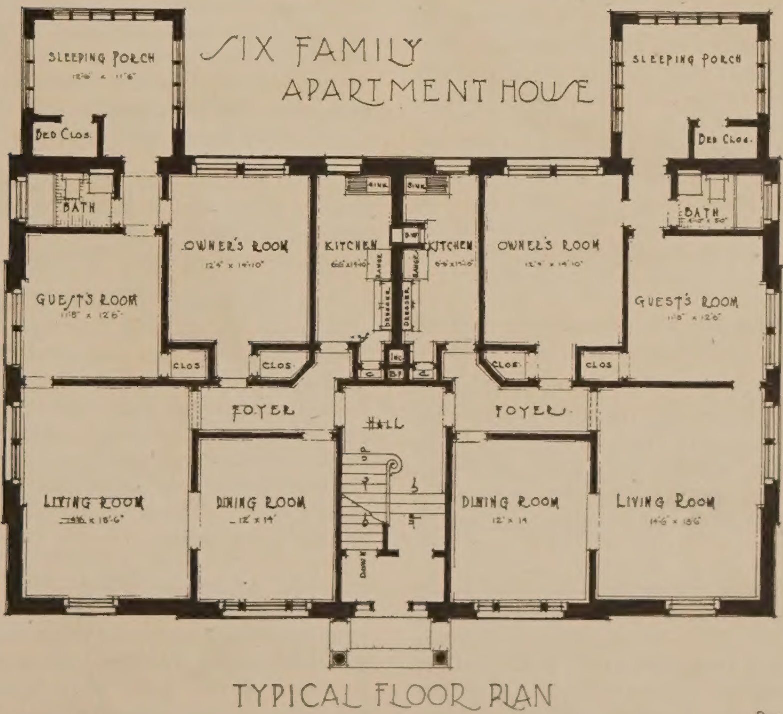
The building will be erected by The Joint-Owners Construction Company. It will be four stories high, faced with a buff tapestry brick, and be of fireproof construction. There will be six apartments, in suites of six rooms—living-room, dining-room, foyer, kitchen, two bedrooms, bath, and enclosed sun-porch. The dimensions of the various rooms are shown on the typical floor plan. Each apartment will have a servant's room on the fourth floor, also a locker-room in the basement.

Each apartment will have an enclosed porch with a disappearing bed, thereby making a combination sleeping and sun porch. There will also be a large brick fireplace in each living-room. Other features will be concealed wall-safes, connections for individual ice-making machines, electric bathroom heaters, laundry-tubs, and clothes-drying machines in basement.

The six apartments will be individually owned. A stock company will be formed and each owner will purchase an amount of stock equal to the cost of his apartment. The six owners will constitute a board of directors who will look after the management of the building. The total expenses of running the apartment-house for the year will be divided among the six owners and will be paid for in monthly instalments. If the owner wishes to rent or sell his apartment, he must submit the name of the prospective tenant or purchaser, and this person must be approved of by the board of directors.

There are a number of privileges however, that are allowed to the purchaser of an apartment.

Many advantages are derived from the "joint-ownership" plan. Among them are the benefits in saving of the constructing of one co-ordinated apartment-house rather than six individual homes, the proportionate saving in running expenses, the exclusive location, and the savings in rent of approximately 16 per cent per annum on the investment.



SIX-FAMILY CO-OPERATIVE APARTMENT-HOUSE, BALTIMORE, MD.

Roy G. Pratt, Architect.

Announcements

We have received from the Machen Electric Manufacturing Company the circular covering their "No-lus-plug" type of Standard Receptacles. The construction of this receptacle is new and overcomes a very serious defect that formerly existed. The circular shows the construction of practically all standard receptacles now on the market. We believe that all users of electricity will be interested in knowing about this device.

Mr. Charles Downing Lay, landscape architect and town planner, announces his removal to the Architects' Building, 101 Park Avenue, New York.

At the annual stockholders' meeting of the National Fire Proofing Company the following directors were re-elected for three years, their terms having expired: W. M. Scaife, E. W. Gwinner, and E. H. Straub. Sidney F. Hickert, a director, presided. President H. M. Keasbey reviewed the building conditions of last year and pictured a promising year for 1922, based on the manner in which business is being offered. He said the orders received last month for building tile were twice as large as the same month last year and the unfilled tonnage on the books also is larger. The present outlook was for a normal business year. The plants of the company are at the highest state of efficiency. The government is taking great interest in clay industries in order to improve the burning of kilns, and the company, Mr. Keasbey said, had kept up to the latest in everything and this would be demonstrated in the new East Liverpool, O., plant. Mr. Heckert said he felt the company was never in better condition physically to show good earnings provided it gets the business, and the outlook is encouraging. The stockholders gave the directors a vote of confidence.

The Deschanel Cableway is a patented apparatus designed especially for the purpose of meeting handling problems such as are confronting industrial plants and coal dealers, when unloading material directly from railroad cars and barges to ground storage, other secondary storage, or direct to boiler-house, bunkers, and coal-bins. The Deschanel Cableway, when installed in a power-plant, can be used for reclaiming coal from storage and delivering it direct to coal-bunkers or boiler-room floor, and removing ashes from boiler-room to railroad cars, truck, ground, or overhead storage. All operations are performed with the same equipment, without any change whatsoever.

Adden & Parker, architects, announce the removal of their offices, March 1, 1922, to 177 State Street, Boston, Mass.

Robert Whitten announces that he has opened offices at 4614 Prospect Avenue, Cleveland, Ohio, for professional practice in general city planning and city zoning. Mr. Whitten will be associated with A. D. Taylor, landscape architect and town planner, and will have the assistance of his thoroughly equipped technical and engineering organization.

Layton Allen, architect, Indianapolis, Ind., and Hubert M. Garriott, architect, Logansport, Ind., are pleased to announce that they have associated in the practice of architecture. The new firm will be known as Allen & Garriott, Architects, with offices at 401 Lombard Building, Indianapolis, Ind., and 4 Masonic Building, Logansport, Ind. Catalogues and data are desired in both offices to bring files up to date.

Hobart Upjohn, in opening his new offices in the Grand Central Terminal, New York City, takes pleasure in announcing that in his practice of architecture he will have associated with him Aaron G. Alexander and Otto F. Langmann.

H. T. Lindeberg, architect, 2 West 47th Street, New York City, announces the opening of a branch office under the management of his associate, Mr. John F. Staub, in the Union National Bank Building, Houston, Texas.

W. Henry Mayer, architect and engineer, has moved to his new and more spacious offices in "The Regis," 3327 Montgomery Road, Cincinnati, Ohio.

"Zinc as a Paint Pigment," an address by W. Homer Hendricks, general sales engineer of the New Jersey Zinc Company, contains facts of interest on the relative values of certain paint pigments.

We have received the valuable and attractive Portfolio of Plates of Architectural Details in Brickwork from The American Face Brick Association, Chicago. This should prove a most desirable collection of plates for the architect's reference library.

Copper for Roofing.—A roof should be light but strong, everlasting, proof against fire and lightning, sun and snow or torrential rains. It should not rust; neither should it cost a penny after it is installed. The material should be easy to form, and itself be made in a form easy and inexpensive to apply. A roof should be beautiful with a beauty that endures—a beauty that harmonizes perfectly with the house beneath it and the environment. A roof should not cost too much, yet should cost enough to insure perfect service forever. Anaconda copper roofings are said to meet these qualifications.

A recent number of "The Mosler Messenger," published by the Mosler Safe Company, contains a number of interesting illustrations of some of their recent safety equipment for well-known financial institutions. In these days the assurance of an impregnable steel fortress for the protection of valuables seems more than ever necessary.

The Bulletin No. 246 of the Sturtevant Generator Cooling Apparatus, B. F. Sturtevant Co., Hyde Park, Mass., contains information of interest to architects. It is handsomely printed and well illustrated.

The Pittsburgh Builders' Exchange has established a scholarship for $300 at Carnegie Institute of Technology. Under the terms this amount will be available each year during the life of the scholarship to be awarded to meritorious students in the Department of Building Construction, College of Industries. Awards will be made on the basis of scholastic standing, good character, and evidence of the exceptional promise for success in the building construction industry. The scholarship may be divided at the discretion of the faculty.

The Lyons Manufacturing Company, New Haven, Conn., is sending out a folder giving information about their new interlock casement-window adjuster—an interlock adjuster consisting of simple telescoping parts, fitted with a friction lock that holds the window in any position. Just move the window in or out and it *stays*. No clamp screws to tighten or catch draperies. No slotted bars to fill with dirt.

(*Continued on page* 174)

Simple Facts About Paint and Varnish

By David B. Emerson

OF all the many elements which enter into the construction of a building there is hardly one of which the young architect and draftsman know less about than paints and varnishes. It all appears to be shrouded in mystery and surrounded by deep secrecy. The fact is, there is nothing mysterious nor secret about it at all, the only condition being that we generally see the finished result and do not take the pains to learn the methods by which this result has been obtained.

Now it is not the writer's intention to enter into a long technical discussion of the chemistry of paints and varnishes, as he lays no claim to being a chemist, but merely to state in a simple manner the general facts about paint and varnish which may be of interest to the draftsman, architect, or architectural student.

Paint and varnish have a twofold purpose: the protection and preservation of the surfaces to which they are applied and the decoration of those surfaces. They have been used for these two purposes for centuries, and will probably continue to be used for centuries to come. The two constituent parts of all paints are pigments and vehicles. The pigments are the solid portion and give to the paint its opacity or covering power and its color. The vehicle is the liquid portion—that is, the oil, dryers, and volatile thinners. The principal pigment used in painting, the base of practically all paint, is white lead, technically basic lead carbonate, and the principal vehicle is linseed-oil. But as the mixture of lead and oil alone does not make a satisfactory paint other ingredients are necessary. Lead has a lack of spreading power and a tendency to "chalk" and dust off after a short space of time; also, sulphide gases in the atmosphere, especially in cities, cause it to turn black. These defects in white lead may be corrected by the addition of "zinc white," which is zinc oxide, which possesses extreme whiteness, high spreading power, permanency of color, and durability, qualities which white lead does not contain. On the other hand, zinc white is deficient in opacity as compared with white lead, producing a hard and brittle film when used alone; therefore, one acts perfectly as a corrective to the other.

In specifying white lead one should specify that the lead should be basic lead carbonate; otherwise, if only "white lead" is specified basic lead sulphate or sublime white lead, which has not the qualities of lead carbonate, may be used, or a lead carbonate produced by the "quick" or "mild" processes, which are not equal to the "Old Dutch" process, may be used. Zinc white may be specified to be made either by the "American" or direct process, or the "French" or indirect process. Generally, the American process is used for ordinary house painting and the French process is used for interior work and decorative paints. For special work imported French zinc is frequently used.

Linseed-oil is a drying oil—that is, it forms a firm weather-resisting film by oxidation, thereby binding the pigment which is held in suspension solidly to the surface over which it has been applied. It is without a doubt the best vehicle obtainable for general painting purposes. Raw linseed-oil is most generally used, but for special purposes, particularly where quick drying is desired, boiled linseed-oil is used.

To facilitate spreading and to make the paint work better under the brush, it is necessary to add a volatile thinner to the paints. There are a number of such thinners in use, the principal ones being turpentine, mineral spirit, and benzine. Probably the best of these is turpentine. Volatile thinners evaporate quickly and accelerate drying, also they assist in the penetration of the priming coat into the wood, and by destroying the gloss of the undercoat they improve the adhesion of the subsequent coat.

In addition to drying oils and volatile thinners, driers which are oxides of lead and manganese dissolved in linseed-oil are used. There are two kinds of driers—"liquid driers," which contain turpentine and benzine in addition to the oils, and "Japan driers," which contain also gums and gum resins. Driers should always be used very sparingly, as too much drier, by hastening the oxidation of the paint film, destroys the life of it.

So far we have only discussed white paint, but added to the white lead and the zinc white we must, if we are going to have any color, have colored pigments if we wish tints. These form but a small part of the paint, as a very little colored pigment will tint a large amount of paint. These colored pigments are natural earths, such as siennas, umbers, and ochres, which are washed, dried, burned, ground, and otherwise treated; metallic oxides, and the different chemical colors.

There are many other forms of paint in addition to the white lead and oil mixture, which are used for various special purposes, such as anti-corrosive paints for steel and iron, damp-proof paints, acid-proof paints, flat-wall paints, and a great many others. One of the best anti-corrosive paints is a mixture of red lead, which is an oxide of lead, mixed with raw linseed-oil, mineral spirits, and drier. On account of the tendency of red lead to harden, red-lead paints must be mixed as used, and never more than enough to last twenty-four hours should be mixed at any one time. Another good anti-corrosive paint is now being made from a base of "cotton rubber," a by-product of the cotton-seed oil industry, which resists corrosion and also resists acid fumes, etc. Red-lead paint, when used to protect iron or steel, should always be given a protective coat, and one of the best in general use is one in which the pigment is graphite, which pigment is also the base of many acid and alkali proof paints.

Most damp-proof paints are made up with an asphalt base, with the addition of volatile thinners. Flat-wall paints almost invariably have as a pigment lithophone, which is a zinc pigment, being a combination of zinc sulphide and barium sulphate and a small quantity of magnesium silicate or talc, which acts as a binder. The vehicle in these paints is China wood, or tung oil, which is an oil expressed from the nuts of the tung-tree which grows in China. China wood-oil is much more waterproof than linseed-oil, and it is also used in the manufacture of varnishes.

Varnish has been defined as a solution or fluid, usually transparent or translucent, and occasionally opaque, which, when spread upon a surface in a thin film dries partly by evaporation and partly by oxidation, forming a protective coating, which may be either highly lustrous or practically devoid of lustre. It should consist of fossil resins, which are copal, etc.; drying oils, either linseed or China wood-oil, which render the varnish elastic or durable; metallic driers, which are lead and manganese salts incorporated with the oil to hasten the drying of the varnish film by oxidation, and the volatile solvents, turpentine, benzine, or a combination of both, which aid the spreading of the varnish upon the

work. The first three ingredients are cooked together and then thinned with the solvents. In the finishing of woodwork, besides varnish it is also necessary to use stains, fillers, and shellac, to obtain the proper results.

Stains are used to darken woods, to change their color, and to produce the effect of the more expensive woods, where the commoner and cheaper woods are used. There are four classes of stains in general use, as follows: aniline oil stains, which penetrate the wood and give good color, but their great fault is bleeding through the varnish, which is caused by the alcohol and thinner dissolving the dye. Aniline spirit stains, which are hard to work, being almost impossible to apply to any large surface. Their great fault is the same as oil stains, bleeding; also they fade. Pigment oil stains, which are made by grinding color pigments in linseed-oil and thinning with spirits of turpentine. These are no more than a thin paint; they do not penetrate as do the anilines, but they do not bleed nor fade; also, having a linseed-oil base, they have a certain tendency to preserve the wood. Acid stains; this name is a misnomer, as they are made by dissolving certain dyes in water. Some manufacturers have begun to frankly call them "water stains." They are a perfectly clear solution, work very easily under the brush, and may be spread out over a large surface with a great degree of evenness. They have very little tendency toward bleeding, and are very permanent as regards fading, for the reason that alcohol and thinners do not pick up the dye, which is soluble in water. For almost all purposes acid stains are the best for general use, but they should never be used on yellow pine, as they raise the grain of that wood and make it very difficult to finish it properly.

Fillers are necessary in the finishing of all open-grained woods, such as ash, oak, chestnut, walnut, mahogany, rosewood, teak, elm, and butternut, which must be filled before varnishing. There are two classes of fillers, liquid fillers and paste fillers. Liquid fillers are composed of gloss oil, which is a preparation of naphtha and resin, a small quantity of linseed-oil, and pigment, which is generally asbestine or china clay. They should never be used for floors nor on any exterior woodwork. Paste fillers are made by grinding together pigment, linseed-oil, and Japan drier. The best pigment is silex, which is powdered quartz. Shellac is valuable as an undercoat for varnish, as it prevents the stain from bleeding through. It should be a pure gum shellac dissolved in alcohol, and should contain no resin.

There are many types of varnish at present on the market; in fact, some manufacturers list as many as one hundred and fifty, but we will only consider a very few of the types which are most generally used. They are divided into two classes, one containing a large proportion of oil and known as "long oil" varnish, the other containing a preponderance of gums, and known as "short oil" varnish. The types of varnishes which are most commonly used in architectural work are interior varnishes, rubbing varnishes, spar varnishes, floor varnishes, flat varnishes, and enamels. Interior varnishes should have a fair body, a fairly light color, permanency of lustre, moderate hardness, be moderately rapid in drying, and be indifferent to occasional moisture. Rubbing varnishes should be hard and comparatively brittle, and should not soften under the heat generated by the friction of rubbing, nor should they be affected by the oil or water used in the process; also, they should be capable of taking a glass-like polish. Spar varnishes are a tough, elastic, long-oil varnish, drying rather slowly, having a moderate lustre, remaining elastic, and having a pronounced resistance to moisture. Possessing these qualities, they are used mostly on exteriors and other places where there will be an exposure to the weather or to an excess of moisture. Floor varnishes, as their name indicates, are designed primarily for use on floors, and they must be very tough, able to resist shock or abrasion, should be medium quick in hardening, and should not be affected by moderate contact with moisture; in fact, they should possess the general qualities of spar varnish, except that they should harden more quickly and more completely. Flat varnishes are varnishes which are designed to produce a matt or lustreless finish. They are special products and are generally of a complex composition.

Enamels, generally speaking, are varnishes to which color and opacity have been given by the addition of pigments, what might be called pigment varnishes, or varnish paints. There are three classes of enamels: gloss, egg-shell, and flat. The pigments generally used in enamels are zinc white and lithophone, the vehicle is linseed-oil highly refined in the high-grade enamels, and China wood-oil, or a mixture of China wood-oil and linseed-oil in the cheaper grades. Some enamels also contain varnish gum. The best enamels are long-oil enamels. Gloss enamel is more durable than egg-shell or flat. If a flat effect is desired in enamel, it is better to use a gloss enamel and then rub it to a flat finish, but this is, of course, quite expensive. In rubbing enamels they must always be rubbed with pumice stone and water; whereas varnishes may be rubbed either with oil or water.

Varnishes should never be thinned on the job, as the thinners are added to the varnish while it is hot during the process of manufacture, and any attempt to thin it afterward will ruin the varnish. Varnish should never be applied in very cold or very damp weather. The ideal temperature is around seventy degrees Fahrenheit. Also rooms should be well ventilated when varnishing is being done.

The foregoing is but a brief outline, but may possibly give to the draftsman or young architect a better knowledge of paints and varnishes, and assist him in the specifying of them.

Announcements

(*Continued from page* 172)

The Arden Gallery, 599 Fifth Avenue, announces an exhibition and sale of summer furnishings for house and garden, to continue until August. Iron furniture for porch and terrace, especially designed and made by Mr. Morgan Colt, of New Hope, will be shown, as well as bridge and tea tables, decorative paintings, screens, hangings and original painted furniture of Arden design. These form only a part of the exhibition, which will be made continuously interesting by frequent additions and changes.

For Better Street Lighting.—Better street lighting that is not only practical but also ornamental and suitable from the architectural standpoint, is the aim of the educational campaign in behalf of better street lighting being conducted by the Westinghouse Electric and Manufacturing Company. Throughout the movement, which is national in scope, the architectural requirements in street lighting are being stressed.

J. Hunter McDonnell and Howard B. Peare announce the establishment of a partnership for the general practice of architecture under the firm name of McDonnell & Peare, at 101 Park Avenue, New York City. Manufacturers' catalogues and samples requested.

Herman M. Sohn, architect, announces the removal of his offices to the Winfield Building, 469 Fifth Avenue, New York City.